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NEWSPAPER

The Gang's All There



'Transitional' Joint Puts Emphasis on User Topics

By Edward J. Bride
Of the CW Staff

ANAHEIM, Calif. — Transitional Joint Computer Conference?

The final Fall Joint Computer Conference will take place here next week, but the FJCC is considered by many to be transitional, because it takes on many of the aspects of the new conferences. After 20 years of twice-a-year meetings, the old joints give way to a single, national, annual show, as of next June.

The meeting at the Anaheim Convention Center, Dec. 5-7, will see some as-

FJCC coverage begins on page 25.

sociated events held at the nearby Disneyland Hotel and the Royal Inn.

User Emphasis

Part of the new look is an emphasis on user topics, with 50% of the FJCC technical program devoted to users.

Additionally, four all-day user seminars are being conducted for DP people in manufacturing, banking, medicine and information data centers.

These vertical adjunct seminars are expected to grow into more comprehensive seminars planned and presented by some of the industry-oriented societies such as the American Bankers Association, according to sources at the American Federation of Information Processing Societies (Afips), conference sponsor.

Besides the technical program with 60 sessions, exhibits will feature over 150 firms showing their wares in 410 booth spaces, a sellout and a significant upturn

from recent exhibits, Afips said. (see industry story on page 29)

While the federation is still predicting an attendance of around 20,000, all Afips-sponsored charter flights were cancelled, because of either a lack of interest or because of competitive rates already of-

(Continued on Page 2)

On Freed Individuals

Some Arrest Data Banned

By a CW Staff Writer

DENVER — In what could become a precedent-setting action, the Colorado Supreme Court has barred the compilation of arrest records on persons who have not been convicted of crimes.

The move makes it illegal for police agencies, at least those here, to store or transmit criminal history information or rap sheets on persons arrested for criminal acts but never convicted.

FBI System

The criminal history information is the backbone of the FBI's nationwide Computerized Criminal History system which collects such information from local state agencies for storage on a national scale.

"There exists in the individual a fundamental right of privacy — the right to be left alone," the court stated in making the decision.

In addition, the court stated there is an increasing awareness of the potential "economic and personal harm to an individual if his arrest becomes known to employers, credit agencies or even neighbors," and that a person with a record is more likely to come under police scrutiny than one without a record.

Determining Bail

The court also said there is a tendency among prosecutors to use rap sheets when deciding whether or not to charge a person with a crime and that the amount of bail set in specific cases is often based on

Supreme Court Rules Against Program Patent

By E. Drake Lundell Jr.

Of the CW Staff

WASHINGTON, D.C. — Programmers dreaming of getting rich by developing and patenting computer programs had their hopes dimmed last week by the Supreme Court.

The High Court, in a unanimous decision with six justices participating, ruled that some computer software is not patentable.

Thus the court upheld the claims by the Patent Office and the large mainframe makers and rejected those of many computer users and the software industry.

While some sources felt the court closed the door on all software patents, the decision contained contrary statements.

Justice William O. Douglas, who wrote the opinion on the unanimous decision cautioned:

"It is said the decision precludes a patent for any program servicing a computer. We do not so hold."

The court held that some programs are essentially ideas and that "it is conceded that one may not patent an idea" as would have been the case if the patent in question (Benson-Tabbot) had been allowed to stand.

The Benson-Tabbot program was originally rejected by the Patent Office because it was "essentially a series of

mathematical calculations or mental steps" and not a process that could be patented.

In 1971, the Patent Office was overruled by the Court of Customs and Patent Appeals which allowed the Benson-Tabbot patent.

But the Supreme Court, in agreeing with the Patent Office's position, indicated that "phenomena of nature, mental processes, abstract intellectual concepts aren't patentable as they are the basic tools of scientific and technological work."

Such a discovery, Douglas said, can only be patented if it is applied "to a new and useful end."

The claims in the Benson-Tabbot patent weren't limited to any particular digital computer or any specific end use, the court held. Instead, Douglas said, the claims in the patent covered typical programming procedures to solve mathematical problems of converting one form of number system to another that could be handled by the computer system.

The process claimed in the Benson-Tabbot patent "is so abstract and sweeping as to cover both known and unknown users" of the program for computer conversions of number systems, the court found.

While the court found the Benson-Tabbot patent too broad for patent protection, patent lawyers said last week that no patent on software would be accepted under the guidelines laid down by the court.

The court admitted this in its decision, passing any further action on the issue along to the Congress for action.

"If these programs are to be patentable, considerable problems are raised which only committees of Congress can manage, for broad powers of investigation are needed, including hearings which canvass the wide variety of views which those operating in this field entertain.

"The technological problems tendered in the many briefs before us indicate to us that considered action by Congress is needed," the decision said.

(Continued on Page 4)

Library Can't Buy Its Software Due to Conflict Over State Law

By Don Leavitt

Of the CW Staff

WORCESTER, Mass. — A special-purpose minicomputer for the public library is not being used because the city auditor has refused to pay for the programs to be written, citing a state law which prohibits any city or town owning a computer from buying "DP services" from outside sources. The city's legal department approves of his refusal.

The mini, a Lib-100 from Computer Library Services Inc. (CLSI), Wellesley, Mass., has not even been delivered although it was paid for last spring.

Ultimately, either the library or the city may have to hire a programmer to do the work. Beyond that, however, City Auditor Guy V. Lapriore's refusal could affect

a number of municipal DP installations in Massachusetts.

The state law referring to outside DP services includes programming and so the software acquisition part of the library's contract is illegal, according to Lapriore. Assistant City Solicitor Bennett S. Gordon agrees.

In an opinion accepted by the city council, he said the contract is for data processing services "because CLSI will set up the computer so the operator will not have to do any independent thinking" to get a desired output.

The directors of the library disagree and have voted to hire a lawyer to fight the Gordon interpretation in court. Head librarian Joseph S. Hopkins has categorized

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State Revamps Vendor Payment System After Checks Go Astray

By Molly Upton
Of the CW Staff

CARSON CITY, Nev. — The state controller's office has revamped its procedures for the new centralized vendor payment system after five checks to the wrong persons were issued.

"The system works fine, but the problem lies in training the user agencies to make adequate use of it," observed acting Deputy Controller Robert Combs.

In making the transfer from an individualized office vendor payment system, the state effected a coding procedure for each vendor, and centralized mailing of the checks from the controller's office. The office then sent check registers to the agencies for verification of amount and vendor.

But the agencies didn't match the check reports against their vendor vouchers, and "about five checks got away from us," Combs observed. The agencies "were not looking at that report. They didn't know what the hell it was," he added.

In addition, a transposition in the vendor number would cause a check to be issued to the wrong vendor. "But that should be caught by the agency," he said.

The state now sends both the checks and the registers back to the individual agencies, which check the names against their voucher lists.

The controller's office, before sending out the checks, inspects not only the vendor code, but also the first 10 characters of the vendor's name. "So

we're using a dual validation code now," explained Combs.

"We caught so much flack as far as mailing the checks out of our office directly . . . We fought, but we lost that one," he noted. Actually, having the agencies mail the checks will save the controller's office about \$12,000 in postage, "but as far as we're concerned it's an inefficient method of handling. It takes an additional day to get the check to the vendors."

The new system was designed to cut down on the volume of checks being issued, to enable the state to produce the federally required form 99 for vendors and also to be aware of the dollar volume being paid to vendors, he explained.

The largest misdirected check was for \$500, which went to a woman in Las Vegas. "We got burned pretty good," Combs added. "Luckily, nothing really big got out of here. Some of our checks are for more than \$1 million."

All the checks incorrectly issued were returned to the controller's office, with no problems.

The new vendor payment system was put on the state's 370/145 in July. "From a data processing point of view, we were ready to go operational; from a user training point of view, we were not."

We're paying the price for that now, but that will resolve itself in time," he observed. "It's just a problem of getting the manual interfaces to a point where they run smoothly."

Worthless Documents Checked

By Marvin Smalheiser
CW Correspondent

LOS ANGELES — The \$900,000 computerized information system to reduce the amount of losses in the city from bad checks and other worthless documents started by the Los Angeles Police De-

partment will go on-line next year [CW, Sept. 15, 1971].

Capt. Frank Beeson, commanding officer of the Bunco-Forgery Division, said the system is now functioning in a batch processing mode but will go into an on-line test mode in April and on-line in November 1973.

The system, initiated in 1969 by Beeson, is aimed at forgers — bad check passers — who accounted for 46,126 worthless document crimes resulting in losses of \$4.1 million in 1971.

Called Automated Worthless Document Index (Awdi), the system now has 75,000 lines in its data file, and will have about 350,000 lines when fully operational.

Hardware from the Los Angeles City Data Processing Department is used and it is linked to two CRTs and a hard-copy terminal at the police department.

Data about forgery-related crimes is input into the data file so the police can work from a wide range of leads that include bank account numbers, automobile license plate numbers and other information not previously available.

The system was designed by Beeson and two programmers and is currently operated with a 24-hour turnaround.

When the system is fully operational on-line, plans call for it to be expanded for use by Los Angeles County and state law enforcement officers.

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Justice 'Needs' Help in Suit

NEW YORK — The judge in the government vs. IBM antitrust case last week told the Justice Department that it "should consider" adding more manpower to its effort in order to speed the progress of the case.

At the same time, Chief Judge David Edelstein told the lawyers he had a "timetable" for the case that he would announce shortly.

While no details are known, legal sources indicated the judge would probably order the parties to be ready to go to trial on the entire case by next June or July.

The sources indicated Edelstein would probably reject the IBM motion for a separate trial on the market issues alone before the end of the year, but at the same time order an early trial date, certainly before the end of 1973 if not sooner.

In addition to telling the Justice Department to consider adding more people, Edelstein said "in view of the plans I have for picking up the pace of this case" he would suggest that Justice "cut away" from the private Con-

trol Data suit against IBM and take its own depositions and perform its own discovery procedures.

In the past the government has relied in large part on the depositions taken in the Control Data action and on the discovery procedures undertaken by Control Data.

The Justice Department told the judge it thought that enough people were already on the case, but indicated the volume of the records was the bottleneck in the case.

For example, the Justice lawyers noted they had 700 volumes of transcripts of depositions alone, all of which had to be read.

Also at last week's hearings, the parties involved arranged for a trip to Cape Kennedy and Goddard Space Flight Center during the upcoming Apollo launch in early December so the judge could get a feel for the role computers play in such undertakings.

Some sources noted this trip might be a point in favor of IBM, since many of the machines used in the space program were from Univac and other non-IBM manufacturers.

Final FJCC, Transitional Show, Puts Emphasis on User Topics

(Continued from Page 1)

ferred by one airline (applicable only if travelers were willing to stay on the West Coast for seven days), Afips reported.

A few of the related activities actually precede the opening of the conference.

Data Security Session

Robert Courtney, IBM manager for data security and privacy, will participate in a panel discussion Monday evening. Sponsored by a subgroup of the Association for Computing Machinery, the session is entitled "integrated vs. separate control of data security," and will be held at 8 p.m. in the Disneyland Hotel.

During this meeting, sponsored by the ACM Special Interest Group on Computer Systems Installation Management, a new product will be discussed by Jerry Kennedy, president of Basic Computing Arts of Palo Alto.

The product, according to ACM officials, introduces a concept of security

control residing in a minicomputer which monitors and protects data and programs within the system being protected.

There is also a Tuesday evening security session from 8-11, as part of the regular technical program.

For attendees who did not preregister, the following fee structure applies to the various categories of attendance:

Members of Afips societies pay \$35 for full conference, nonmembers pay \$50; students and military pay \$5. The fee for one day only, including technical sessions, user seminar and exhibits, is a flat \$15.

One-day exhibits only cost \$5; exhibits only for all days costs \$10; the conference luncheon on Thursday will cost \$6, and the special luncheon during the banking seminar costs \$5.50.

Related events include a free wine-tasting party Monday evening, and the conference reception, for \$5, Tuesday.

Judge Hopes to Spot Bad Drivers

FRESNO, Calif. — A two-year pilot study of a computer system aimed at removing from the road habitual traffic violators has begun at the Fresno Municipal Court. Additional plans call for implementation of the system at the county's 14 justice courts by the beginning of next year.

The system is designed to provide traffic judges with a defendant's complete driving history to help the judge determine the sentence.

Whenever the traffic department at the court receives a copy of a ticket for a

moving violation, explained supervising clerk Edward Deis, an on-line inquiry is made via magnetic tape to the state Department of Motor Vehicles in Sacramento. The violator's history is then sent back and a printed copy is attached to the docket for the judge.

"The whole concept is to identify bad drivers in the interest of traffic safety," Deis said. Such identification, he added, should help reduce accidents by allowing the court to remove such drivers from the roads, or reeducate them in safe driving habits.

360 User Happy With 3330-Like Drive

PITTSBURGH — The first IBM 360/65 user to install a 3330-like disk drive is "extremely satisfied" with the results of the first month's operation.

Mellon National Bank and Trust Co. here installed an Ite 7830 controller and Ite 7330 disk drive last month. It reportedly is the first installation of a 3330-like device on non-370 equipment, since IBM only offers the 3330 devices to 360/85s and up and the 370 series.

The bank is "very satisfied" with the operation of the system, according to Francis Madden, DP director, who indicated the units were installed and

working as easily as the firm's previous 2314 drives, in addition to providing the increased capacity and speed of the 3330.

The bank is also sharing the 7330 system between its two 360/65s and a huge 360/195 as it moves to convert from a 2314 shop to an entire 3330 operation.

"We don't really have any performance data yet," according to programmer Don Michaels, who indicated, however, that the system was operating "beyond our expectations."

Basically, he explained, the bank is presently using the 360/65 system

with the 7330s to back up the 195 and the major files on the 7330 at present are generally source libraries and the like.

He noted, however, that the bank tried to run one benchmark to find the effectiveness of the system by taking an I/O-bound job from the 195 and running it on the 65. "But the test was CPU bound on the 65," he said, so the bank did not get accurate data on the operation.

"We disbelieved that it would work for the first week," he said. "But now it just sits there and works fine," he added.

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Tape drives. (Configurations to go with both IBM 360 and 370 systems. See next column.)

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360/370

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Library Can't Buy Its Software Due to Conflict Over State Law

(Continued from Page 1)

the opinion as "unrealistic and damaging."

If Gordon's view of the law stands up in court, the DP manager in any Massachusetts municipality that owns a computer may have to review his outstanding or planned projects, according to one industry observer. "Obviously," any contract for custom programming would be outlawed, he noted.

Beyond that, however, the purchase of many software packages may also be deemed illegal, he added.

The only programming CLSI would do specifically for the Worcester Library, he

explained, is likely to be minor modifications to the company's standard application packages. This tailoring is done for most CLSI clients, a company source agreed.

Customization the Same?

Such customization is no different from the installation support offered by many software vendors, the observer noted. If it is illegal for a city with a purchased computer to accept the CLSI effort, it must also be illegal for it to accept comparable work from other vendors.

Another problem facing municipal DP managers is that they may not even know

Chapter 40, Section 4, Massachusetts General Laws reads:

"A town may make contracts for the exercise of its corporate powers including the following purposes:

For the purchase of data processing services in the absence of a lease or purchase of data processing equipment . . ."

whether their city owns a computer. They may know that all the equipment in the city's prime DP center is rented, but they may be unaware of a mini or other CPU that has been purchased by or given to some other unit of the city, such as a special mini for engineering schools or — as all of Worcester is now aware — for the public library.

CLSI normally provides its applications as part of a total system because the using library doesn't want to get involved in programming. The company can, however, provide a copy of its own high-level Assembler Language processor if a user wishes, CLSI said.

And that just may be the solution for Worcester.

But Schools Get Their Software

WORCESTER, Mass. — City Auditor Guy V. Lapriore has authorized payments of bills for data processing services being done for the school department by a private firm, even though both he and the city attorneys consider the payments illegal.

Under a recently revised state law, cities that own or lease computers are not allowed to have DP services performed under contract by outside sources. Worcester has a number of computers, including several within the school department [CW, Aug. 30].

Educator Consultant Service Inc. (ECS) will continue to be paid to handle attendance, grading, scheduling and personality rating applications because the city doesn't have the software to do the work itself and the schools cannot function without the ECS services.

The law in this case is the same one involved in Lapriore's on-going battle with Worcester's public library, but the issue there is simpler.

ECS does provide "data processing ser-

vices" and it may be illegal for Worcester to pay for them. But it is impractical to follow the law precisely at the cost of damage to the school system, Lapriore explained.

Another aspect of the problem is that there is now no written contract between ECS and the city. The firm has done the DP work for the school department for the past six years, for about \$115,000/yr, but the last written contract expired in December 1971.

The current work is being done under an oral agreement regarding the price of each ECS service. The total cost under this arrangement is expected to add up to the \$115,000 paid under previous contracts.

In August, spokesmen for the school department's DP section estimated it would take about three months to do the programming necessary to take over the ECS work. There is no indication that any of this conversion work has been completed, or even started.

NSF DP Office Awaits Birth

By Edward J. Bride

Of the CW Staff

WASHINGTON, D.C. — The "nebulous" topic of the computer's impact on society will be investigated by a new office in the National Science Foundation, pending final approval of the NSF Office of Computing Activities (OCA).

The office was actually planned, and some staff was hired, a year-and-a-half ago, but budgetary and other problems prevented a concerted effort in this area, informed sources said.

"We're close to being born," one NSF official said. Spokesmen for the foundation confirmed that a decision is expected around Dec. 1, but would not elaborate on the hierarchy of the office.

It is believed, however, that the budget for the remainder of the fiscal year will be less than \$500,000, and that the main focus of the office will

be on the computer's impact on the individual and on organizations.

One apparent reason for hesitancy, observers noted, is the very nature of NSF and other bureaucratic institutions — the inability to define how the new office would affect other offices.

For example, NSF currently has a division called Research Applied to National Needs (Rann).

Another division called Innovations and Education was removed from the OCA and placed in the foundation's education directorate. Even so, computers will remain a topic of high interest, one NSF source reported.

The OCA also has a "sister office" in NSF, called Science Information Services, and the NSF source said he could foresee that division eventually "melding" with the OCA.

The imminence of the formal approval was disclosed during the recent annual meeting of the NSF advisory committee for computing activities.

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Software Ruled Unpatentable

(Continued from Page 1)

Only a bare quorum of justices participated in the case, with justices Potter Stewart, Harry Blackmun and Lewis Powell excusing themselves from participation. The justices gave no reasons for their abstention.

Mainframe Victory

In many ways the decision is seen as a victory for the mainframe makers, industry sources said last week, and a definite setback for large users and the software industry.

IBM and Honeywell had both filed briefs with the court backing the Patent Office position that programs were not patentable, and the Business Equipment Manufacturers Association also backed that contention on behalf of its membership including Xerox, RCA and GE among others.

Bell's Case

On the other hand, a user, Bell Laboratories, has been assigned the Benson-Tabbot patent by its developers and had pushed hard for patentability.

Other large users backed the Bell position with briefs to the court, including Mobil Oil Co. which said it was backing patentability "to determine how best to protect its proprietary rights in new methods of operation" for computer systems.

In addition, many of the software companies and software organizations had entered the case on the side of the patent holders.

Debate in Congress

With computer users expected to be spending up to \$15 billion a year in computer programming in the next few years, the debate in Congress promises to be intense, with the same battle lines: Users and the software industry allied against the Patent Office and the mainframe makers.

Now that patent protection has been struck down for programming, the only options available to program developers for protection are copyrights and trade secret legislation, one attorney noted, and many users do not feel these afford enough protection, he admitted.

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West Germans Worry About 'Public' Data Banks

By E. Drake Lundell Jr.

Of the CW Staff

WASHINGTON, D.C. — The West Germans appear to be moving forcefully, both on the state and federal level, to erect legal safeguards to protect an individual's right to privacy in computerized data banks, especially when compared to the efforts in the U.S. and UK.

That seems to be the conclusion of a presentation by H.P. Gassmann of the Organization for Economic Cooperation and Development here recently.

At the same time, however, Gassmann indicated the primary concern of most present or proposed privacy laws in Germany is primarily with the protection of personal files in national or state data banks and not with files used by private companies or individual organizations.

At present there are "no spectacular, large systems which could attract international attention" in use in Germany, he noted, "although some are in the planning stage."

This is primarily due to the decentraliza-

tion of government in the country "where the various states have a rather large autonomy and most of the responsibility for the day-to-day administration" rests with these states.

Because of this, "much to the difference of what is happening in North America, the main concern in the field of infringement of data confidentiality seems to be centered not so much on private personal data records, but rather more on what could happen in the public sector."

Two of the major reasons for this concern in the public sector, Gassmann said, are a compulsory population registration system that has been in operation for several years and plans to introduce personal identification numbers.

"Private credit information systems have not been a large source of concern so far in West Germany," he said, largely due "to the fact that credit cards are not as widely used as in the U.S."

Up until 1970 there were no specific laws in the country protecting the confidentiality of data, Gassmann said, noting,

however, that several sections of the West German constitution "implicitly protect the citizen in this respect."

But since 1970, he said, several of the states have enacted laws protecting the confidentiality of personal information.

One state now has a Data Protection Act; three are implementing such an act and two are planning a specific act. In two other states data protection rules are written into the laws authorizing the state's computer operation. Four states, he said, do not have specific laws, but some of these do have internal administrative rules.

Data Protection Act

"The proliferation of legislative initiatives at the state level has prompted the preparation of a Data Protection Act at the federal level," he said, "and consequently legislative action at the state level is at present being slowed down."

The most interesting and comprehensive — and the oldest — law in existence is in the state of Hessen, which enacted a

Data Protection Act in October 1970.

The first part of the act outlines what is meant by data protection and how to accomplish it and the second part establishes a data protection commissioner, sort of an ombudsman to handle complaints and make sure the law works.

The first part "defines the scope of data protection which covers all records prepared for the purposes of DP, all stored data and the results of processing such records," Gassmann said.

"It specifies that persons responsible for the preparation, transmission and storage of data shall be prohibited from communicating or making available to other persons any information concerning the records, data and results gained during their activities," he said.

In addition, "it also formulates a claim to data protection in the sense that if stored data is incorrect, an aggrieved party may demand rectification."

"Another section of the act deals specifically with data banks and information systems. It specifies some rules under which data contained in these information systems may be communicated and published when there is no legal prohibition of disclosure," Gassmann said.

The commissioner, as established in part two of the law, is to be free from all political pressure, Gassmann noted, and has the duty "to insure that the provisions of the act and other regulations governing the confidential handling of information by citizens are observed."

"He has to inform the responsible authorities of any infringement committed and has to initiate measures for improving data protection . . . He shall be entitled to initiate any measures he thinks fit to prevent such an effect."

All citizens have the right to apply to the commissioner when they feel their rights have been violated.

On the federal level, a recent measure introduced in the Bundestag concerning a personal identification number has several confidentiality and privacy safeguards.

First, the act would give anyone the right to inspect all data collected about him and the right to correct such data if incorrect or misleading.

The act also states "that transmittal of personal data to other departments . . . is only permitted if the need for knowledge of this information . . . can be demonstrated. Data security measures are required in the case of use of DP and telecommunications; a record stating the receiver of the information, the type of data given and the time of transmittal is also imposed," Gassmann said.

In addition, another law introduced recently would have more far-reaching consequences.

Under it "a person should be informed when a personal record is entered the first time into" a governmental data system, and he would also have the right to examine his own records.

However, another act goes even further and extends to manual as well as computer-based records, Gassmann said. This act also extends the protections to data kept in private data banks as well as those of the government.

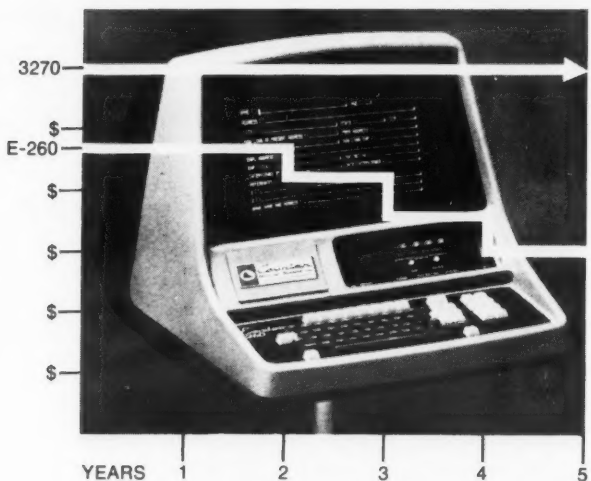
"A right to correction of wrong data is provided as well as a request for erasure of personal information if it has been obtained against stated rules," Gassmann said of this bill.

"In the case of private data bases," he said, "the bill contains more stringent provisions. A person on whom a record is being collected has to be notified, and he has the right to see his record. Information has to be erased if not obtained according to stated rules."

"Upon request of the interested person, it must be erased after five years of collection. Collection of personal information is only permitted through direct questioning of a given person, or through processing of documents provided by this person, unless he explicitly permits data collection in a different form."

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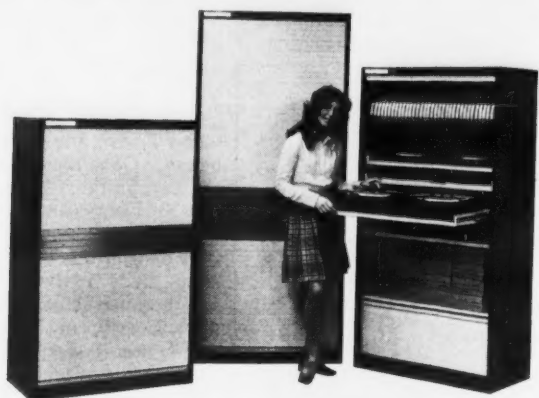
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MEDIA MANAGEMENT SYSTEMS



Sharing Arrangement Is Basis

Vietnamization in DP Area Proceeding on Schedule

By E. Drake Lundell Jr.
Of the CW Staff

SAIGON — The progress made in computer applications by both the government and private enterprise here can "conservatively be termed remarkable," according to one observer on the scene.

In addition, there is as active a campaign toward Vietnamization in the computer areas as elsewhere, according to Thomas E. Marecki of Southeast Asia Computer Associates (Seaca).

The progress made has been against great odds, including the war, the government bureaucracy patterned after that which existed under colonial rule, an "extreme shortage of qualified personnel, and the structure of the culture and language itself," he said.

Thus, it is necessary to consider all aspects of society when developing plans for new computer applications — not just the technical aspects, Marecki said.

The shortage of qualified personnel, he said, is largely due to the manpower requirements of the war and the consequent drain on manpower.

But at the same time, he noted, "progress was slow in recruiting women to supplement the sparse numbers of personnel available to computer applications because of the traditional role women play in the family-oriented Vietnamese culture."

Another significant social factor was that the Vietnamese technicians who were available were generally young and therefore "thought not to have the wisdom of their elders," and this made it hard for them to gain credibility with government officials more wedded to the "traditional" methods of management, he said.

In addition, all Americans trying to advise the Vietnamese in computer use and applications had to overcome a for-

midable language barrier, he said, especially in the area of technical concepts.

In fact, Marecki noted "it became necessary to communicate abstract, highly technical concepts in English, as most of these terms were not found in the Vietnamese language."

Most of the early Vietnamese computer specialists were trained on projects of U.S. agencies, he said, particularly those of the U.S. Agency for International Development (AID) and the Military Assistance Command, Vietnam.

"During the middle of the last decade, systems were designed to assist in monitoring and managing the process of pacification throughout the country," he noted.

Initially, he said, the systems were entirely designed and operated by American personnel, either working directly for the government or for government contrac-

tors. But as the military situation stabilized somewhat, attention was focused on the Vietnamization program to help the Saigon Government remain viable in the absence of U.S. personnel, he added.

To meet these needs, AID worked with the Vietnamese Government to set up training courses in programming, keypunching and other computer-related topics.

In addition, all new systems implemented were designed both for Vietnamese needs as well as American, and Vietnamese officials became more involved in the design of new systems.

Also, the U.S. began to share the systems already in place with the Vietnamese and made all the inputs and outputs bilingual "to maximize the use and understanding of the systems."

With the sharing "came the utilization of the first Vietnamese programmers, data control technicians and keypunch operators," he said.

Confidence Grows

This sharing arrangement made the Vietnamese Government more confident in the capabilities of the computer systems and it began to want to develop its own systems with its own analysts.

To help in this effort, the U.S. Government made hardware resources available to the Vietnamese whenever possible, Marecki said, and advisers were still provided, not to design systems, but rather to provide guidance.

After these efforts had proved successful, notably in the Ministry of War Veterans and the National Police Command, it was decided to establish a Government of Vietnam (GVN) Computer Center.

The center, which was jointly funded by AID and the Government of Vietnam, is being installed in the offices of the prime minister.

Seaca has two contracts to aid in this effort to complete the Vietnamization of computer systems there.

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DP Balloting Proves Too Much for Official

Special to Computerworld

SEATTLE — Repercussions recently surrounded the use of punched card voting equipment in King County polling places.

Edward J. Logan, for 25 years King County superintendent of elections, announced his resignation for reasons of ill health, and blamed the ill health on the "tension and the pressure" of new punched card voting procedures.

After a year's trial in primary elections, punched card balloting was used in about half of the county's 4,000 polling places in the November general election — and there were no problems or incidents during the election.

Logan and Norward Brooks, King County director of records and elections, both issued statements on the security of punched card balloting. Brooks had been responsible for initiating the new system over Logan's objections.

"Something could happen to the ballots on the way downtown, and there would be no record," Logan stated, claiming that punched card systems were too open to fraud. Brooks responded by outlining the security procedures he had instituted to thwart fraud, including assignment of deputy sheriffs to each of King County's 11 ballot-collection depots.

Logan also attacked the ballot system accompanying the punched card system, which he said was complicated and did not provide for convenient error correction.

About 700,000 persons voted in the November election, 500,000 using voting machines in the city of Seattle, 200,000 using the punched card system in more sparsely populated King County.

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Editorial

'Write It Out'

A federal court judge in Philadelphia may have opened a can of worms by ruling that oral promises made by salesmen can be binding in contract questions. The case involved a user of a small computer, who sued his vendor because of lateness and other deficiencies in software.

While the vendor has filed a motion for a new trial, the suit highlights a good point: when in doubt, write it out.

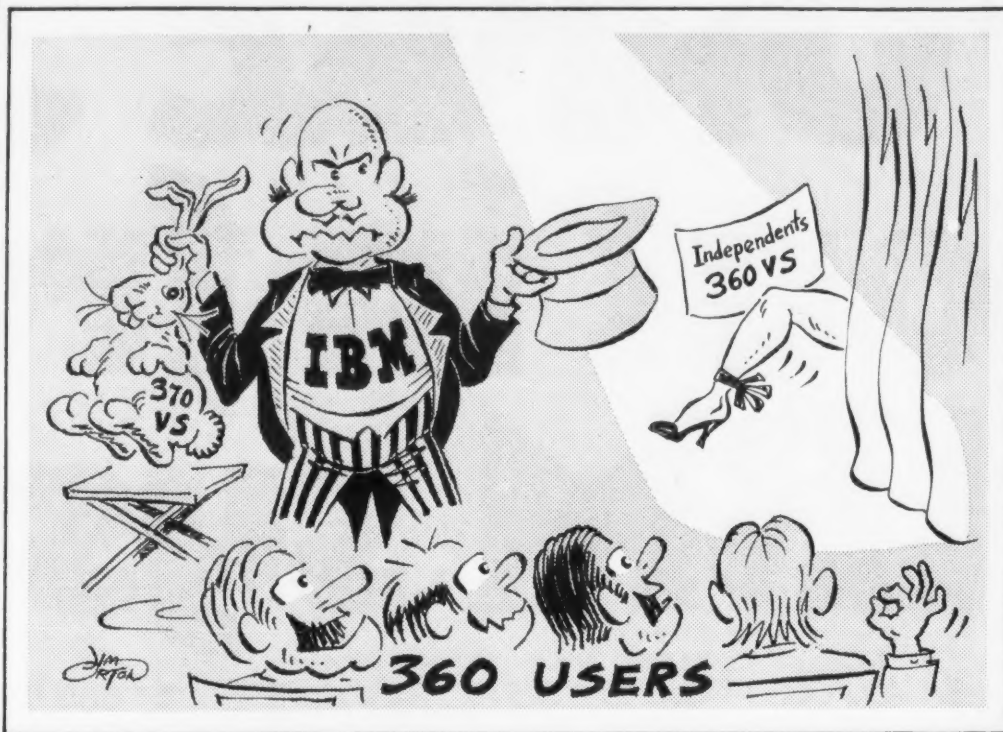
This is a difficult requirement for small systems users, since vendors normally just fill in the blanks with prices and delivery dates, and other terms are "standard," leaving little room for negotiation.

The judge ruled that separate discussions, even if only to clarify generalities in the contract, are just as binding as if they were included in the contract.

Users and vendors should not, however, rely on these discussions, since years of litigation and possible deterioration of accounting records can precede final disposition of a suit.

Because the purchase order may not total six or seven figures, this is no reason for a vague, general and perhaps unenforceable contract.

Distraction



Letters to the Editor

How to Attack IBM— Build a Better Product!

The recent announcement by the Justice Department of its intention to "break up" IBM, makes one shudder at the degree of ignorance that prevails in our once-free society. That the Justice Department can even suggest such action, let alone receive substantial plaudits for it from supposedly knowledgeable economists, is a major indictment of our educational system.

IBM is not, by any rational definition of the term, a monopoly. That it is a huge corporation and that it has achieved a dominant position in the data processing field is undeniable. But should it be persecuted for this or should we recognize that a company able to gain and to retain such a position within a given market by productive ability and superlative marketing, is deserving of praise, not condemnation?

The dictionary defines monopoly as "exclusive ownership through legal privilege." When we use "monopoly" in an economic or political sense, we mean a coercive monopoly, wherein a given field is closed to competition and where those controlling the field can set production and pricing policies outside the economic laws of supply and demand.

To be a monopoly, then, requires the direct or indirect intervention of a governmental body.

IBM achieved its dominance in the DP field by ability. It is without doubt, one of the finest marketing organizations in the world. It was able to foresee and create the real demand for computers at a time when the then dominant company in the field was predicting a maximum of 1,000 computers installed by 1970!

IBM proceeded to fill that need in a manner with few parallels in any industry. I wonder how many of us realize how much we owe IBM for the very existence of our profession in anything resembling its present scope?

There has never been, to my knowledge, a company that was legally forced to do business with IBM. In almost every situation there were, and are, other manufacturers of computer hardware and software able to supply the same or similar products. More are entering the field every day.

A company chooses IBM because, in the main, it feels it is getting the best product at the best price. If it feels otherwise, and many obviously do, it is free to do business with Burroughs, CDC, Honey-

well/GE, NCR or many other DP firms.

IBM may indeed have a 70% or more share of the DP market today. If it can hold onto that share, it will do so because it will supply the DP consumer with what he wants better than the next guy.

So, please! Let's for once attack IBM in the only way beneficial to all concerned. Build a better product and sell it! But don't ask the government to help you. If you do, then you won't be able to complain when it tries to hurt you. And it will!

Robert L. Sullivan
Data Processing Manager

Electronics Corp. of America
Cambridge, Mass.

Government Support of IBM Not Good for Competition

The viewpoint article by Dave Ferguson [CW, Nov. 8] contains so many confusions and misjudgments that it requires an answer.

Restructuring IBM into "several discrete, separate, independent and competitively balanced entities capable of competing successfully in domestic and international markets with one another and with other domestic and foreign competitors" may or may not be the outcome of the Justice Department's suit against the IBM company.

Obviously there are other alternatives that are still contemplated by the Justice Department, including a third attempt to structure a meaningful consent decree.

Ferguson appears to believe that competition will not be stimulated by having more companies competing openly with each other for the data processing market, and is therefore against such a solution.

On the contrary, he tends to believe that the only way to be competitive, particularly in the world market, is to have extensive government support of a single large corporation. He rules out—as apparently too small—companies like GE, Sperry Rand and Xerox from the possibility of providing effective competition to IBM.

The fact that IBM has been under surveillance by the government for its strategies and market control for the last 40 years, and as a consequence of its power currently earns 95% of all the profits in the computer industry, does not seem to Ferguson to be a danger to our free-enterprise system.

Although the data is difficult to acquire, the best Department of Commerce figures seem to indicate the rest of the computer

industry has a more favorable balance of trade as a percent of revenue than does IBM.

This implies that a more competitive environment would be more likely to improve rather than reduce the computer industry's contribution to our foreign exchange.

Dan L. McGurk
President

Computer Industry Association
Encino, Calif.

Beware Fluctuating 'Work'

David Tierney in his viewpoint article on OCR [CW, Nov. 8] points out that key-entry costs are 85% labor, while the OCR costs for a system performing the same workload are based mostly on reader rent and maintenance.

This brings out a serious problem for many installations: as the workload fluctuates, as it is apt to in the computer business, costs are less controllable in a large machine rental operation than they are in a labor intensive shop.

Fred S. Zusman
Principal Computer Scientist
Operations Research, Inc.
Silver Spring, Md.

Handicapped Have Time

In the article, "DP and the Handicapped—Part II" [CW, Nov. 15], a very important point should have been brought up about the severely disabled person working from his/her home—i.e. sponsor/clients in the DP industry in employing or contracting these qualified people.

These questions include the transmittals of programming materials (job requirements, coding sheets, listings, etc.) to and from the computer site; on-line testing and debugging methods from the home; the health factor; and the time element for getting the job completed—just to name a few.

The pickup and delivery of materials can be easily accomplished via the U.S. mails or any local delivery service, or if desired, by the personal visit of the DP manager, senior analyst or the co-assigned programmer to the home of the confined employee/contractor.

The telephone is the fastest link for on-line testing and/or debugging. By means of instructions or display information between the console operator or assigned programmer and the homebound programmer via the telephone, no expensive communication links are needed—just an inexpensive phone call by either one.

The health factor, in most cases, should be the least of all problems; since by the time the disabled person is working with systems and programming, he/she has been fully "rehabilitated" within his/her limits, and is under minimal medical supervision; otherwise, they would not be looking for work.

Generally, if the homebound has anything—that is time! He/she is home seven days a week, 52 weeks a year. In many cases, they will work hours that the non-disabled wouldn't dream of working... evenings, weekends and even holidays, just to keep busy and from getting bored.

Therefore, the two prime assets of the physically disabled systems analyst/programmer over the non-disabled are competitiveness and patience—not from desire, but rather from conditional necessity.

I speak from experience, as I have been doing contract systems analysis and programming from my home these past four years because of my confinement to a wheelchair with muscular dystrophy.

Robert A. Schumacher
Contract Systems & Programming
Chicago, Ill.

LCP—What's It About?

Re Don Leavitt's analysis of LCP (Laws of Construction of Programs) in the Sept. 6 issue:

I congratulate the author, because it is difficult to give an accurate idea of what the methodology is about in such a short space, and Leavitt did it.

However, I disagree with the last two paragraphs of his text. As a user of the methodology for two years I think that if I had to "sell" it to my manager I should point out that:

- First it is a way to reduce debugging time when making a program (experience demonstrates that most programs are operational after just one test).

- The real benefits of the nested set approach become apparent during maintenance operations.

(a) The program documentation is easily understood by any other trained programmer in the fastest possible time (less than one hour).

(b) Changes to be made to the program can immediately be added to the structure because we know exactly where and at what level they should appear.

M. Dambrine

Honeywell Bull
Paris, France

There's Still Time for Ideas on Cobol But It's All Up to the User Community

The response to the Taylor Report [CW, Oct. 11] on points missing from the newly issued proposed Cobol standard was informative. Many of the points brought out new angles and new ideas.

Luckily, there is time to reconsider matters in the light of these ideas. The deadline for all comments to the Business Equipment Manufacturers Association-sponsored X-3 Committee is now Feb. 13 (pushed back from the original Dec. 31 deadline), so we have another six weeks to consider our ideas.

Remembering that such review periods normally occur every five years or so we need every day of it.

In the original article four specific questions were raised: collating sequence, bit manipulation, embedding of other languages (such as Report Writer,

Communications and Mass Storage) under the authority of Codasyl, and whether standard Cobol compilers should be allowed to contain non-standard languages.

Conform to Current Use

Regarding the bit manipulation and the priority between letters and numbers, it was argued that action could take place now, under the basic rules of Cobol. And in order to maintain program investment, any new language should conform to current usage as much as possible.

Neither bit manipulation nor any standard priority between letters and numbers is included in the proposed standard, although there is enough Cobol in use to determine a standard under the basic Cobol philosophy.

The article also pointed out that two questions had been assumed by the proposed standard, but the real questions were not brought out. These questions included the extension of Cobol to contain other special function languages such as Report Writer, Mass Storage and Communications languages. The assumption was that any

compiler which contained a minimum Cobol subset could contain lock-in types of proprietary extensions and still be called Ansi Standard Cobol.

Readers were asked to comment on each of these four points. Some of their comments may give you a few more points to consider. They may even change your mind about your own answers to the questionnaire.

Speak Out

When you have read the comments, please use the questionnaire to comment on anything regarding standard Cobol. Let your voice be heard.

The SCDP Cobol Coordinating Committee is now working with the X3J4 Committee to see that all your questions are answered, and your comments are reviewed. The X3J4 responses will be printed here as soon as they are received.

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The Taylor Report

By Alan Taylor, CDP



What the Readers Want in Cobol

• "Include bit and character string-manipulation such as substring and concatenation as in PL/I.

"Would like the ability to return a parameter list from a called routine. At present if two modules each contain half the data required by each, then data may be referred to in one direction only. The called routine may refer to data physically contained within the calling routine, but the only way for the calling routine to use data physically located within the called routine is for the called routine to move the data back to a previously provided area within the calling routine. This is extremely expensive in terms of core usage.

"Provide the facility to include code written in another language within a Cobol program, such as Exit Cobol, Enter Assembler, Exit Assembler, Enter Cobol. The machine language instructions generated by the assembler would

be embedded at that point within the Cobol object module. Allow data and procedure names defined within the Cobol source code to be referenced by the second language." — Frank Schwartz, Software Analyst, Waltham, Mass.

• "Concentrate on bit manipulation rather than Mass Storage." — David W. Blow, Systems Analyst, Washington, D.C.

• "Let's retain the remarks section — it pertains to entire program overview." — W.R. Hill, CDP, Shawnee Mission, Kan.

• "Standardize mass storage and communications to allow at least some use but as a part of Cobol." — Charles D. Wells, Programmer, Atlanta, Ga.

• "Would like to see newsletters of some sort on current language status." — Bob Peticolas, Systems Analyst, Mesilla Park, N.M.

Questions Readers Are Asking

• "Why is Cobol still so verbose?" — David W. Blow, Systems Analyst, Washington, D.C.

• "Can a decision table compiler be included — preferably horizontal?" — Don Roberts, DP Manager, Wilmington, Del.

• "How are things going on the development of Cobol as a data base query language?" — Erik Albardam, Programming Teacher, Rotterdam, Holland

• "Can't manufacturers be forced to offer non-standard language only on optional Cobol features?" — Kenneth C. Visser, Systems Analyst, Wyoming, Mich.

• "When will Ansi Cobol allow us to ignore output tape files?" — George Novotny, Project Leader, Detroit, Mich.

• "Why not address the common problem of character set differences at this point too?" — John D. Poitevent, Operations Director, Hollywood, Fla.

• "Why have one all-inclusive language?" — Thomas H. Politowski, Systems Analyst, Lan-

sing, Mich.

• "Who will be able to supply information regarding the latest Cobol language standards?" — B. Wm. Swank, Systems Analyst, Phoenix, Ariz.

• "Why not let the compiler expand the coding when listing the program if we want readable Cobol listings, yet minimal source coding?" — Willard B. Johnson III, Systems Analyst, Waltham, Mass.

• "Could bit manipulation be extended in Cobol as bit manipulation was extended from RPG to RPG II?" — David L. Copenhaver, Programmer, Donora, Pa.

• "Could the 'standard' also include standards for documenting the compilers themselves?" — W.R. Steinhurst, Research Assistant, Montpelier, Vt.

• "Why can't standards be reviewed more frequently?" — C.B. Bohlken, CDP, Vancouver, B.C., Canada

What Should Cobol 73 Contain?

1. (A) Should there be a standard priority between letters and numbers? ☐ Yes ☐ No

(B) If so, should it be the same as that used by most current Cobol programs? ☐ Yes ☐ No

2. (A) Should bit manipulation facilities be included in Cobol? ☐ Yes ☐ No

(B) If so, should the most-used available Cobol version be adopted? ☐ Yes ☐ No

3. (A) Should Codasyl embed other languages (Report Writer, Communications, Mass Storage, etc.) in Cobol? ☐ Yes ☐ No

(B) Who should be responsible for other languages?

4. (A) Should Ansi standard Cobol compilers be allowed to contain non-standard language? ☐ Yes ☐ No

(B) If so, should the non-standard language be offered to the Cobol community for possible general adoption? ☐ Yes ☐ No

5. What questions about Cobol do you want answered?

(continue on a separate page if necessary)

Name _____

Professional Position _____

Address _____

Contribution Enclosed \$ _____ Pledge \$ _____

Memberships _____

When completed, please return to the SCDP Cobol Coordinating Committee, c/o The Taylor Reports, Computerworld, 797 Washington St., Newton, Mass. 02160.

Some Views on Cobol 73

• Should there be a standard priority between letters and numbers?

"Blank must be less than letters to agree with common usage. It seems to me that it is easiest and fastest if the character representation and collating orders agree. We already have a standard for character representation (Ascii). The two should be brought into agreement." — Robert A. Fraley, Systems Analyst, Denver, Colo.

"Ascii." — Bob Peticolas, Systems Analyst, Mesilla, N.M.

"If low-to-high sequence is Blank, Numeric, Alpha — yes; if it is Alpha, Numeric, Blank — no." — Lowell Ray Anderson, CDP, Wellesley, Mass.

• Should Cobol include bit manipulation facilities?

"No — It's not a bit manipulation language." — Michael Eisenstot, CDP, Honolulu, Hawaii.

"Include the most used version if its coherent." — John Steel, Business Systems Manager, Blaysville, Pa.

• Should Codasyl embed other languages in Cobol?

"Only on an experimental basis. If they don't work out, let them drop after they have fallen into disuse like Report Writer." — John Steel

"Some as standard modules, others could be 'ENTERED' or 'LINKED.'" — Michael Eisenstot

"Codasyl should establish standard data and control interfaces to permit access to other languages (as Fortran CALL and COMMON). Arguments for CALL should be given a picture in the CALL program." — Robert A. Fraley

• Should Ansi standard compilers be allowed to contain non-standard language?

"Strict conformance should be available on every standard Cobol compiler, by having a mode of operation which will conform strictly with the standard. Extensions are needed because if no extensions are made then all holes will be filled by untried techniques." — Robert A. Fraley

"As long as manufacturers are given license to extend a minimum subset and still label it Ansi-Cobol, standardization among manufacturers will continue to be a joke." — Nelson Cyr, Director, National Board of Acpa, Buena Park, Calif.

"Non-standard language should be offered first to the Cobol community for possible general adoption before being allowed into Ansi standard Cobol compilers." — Mike Hanson, Programmer, Missoula, Mont.

"Include non-standard language as long as a program written in standard language will compile with no problems." — Lowell Ray Anderson

"Yes, but they should not be mandatory." — John Steel

• Who should be responsible for other languages?

"A more responsible group than the present. More working stiffs!" — David Blow, Systems Analyst, Washington, D.C.

"Equipment suppliers." — W.R. Hill, CDP, Shawnee Mission, Kan.

"Ansi." — B. Wm. Swank, Systems Analyst, Phoenix, Ariz.

"Independent standards committee." — John W. McInnis, Information Systems Manager, Minneapolis, Minn.

"What Codasyl is supposed to be." — Thomas H. Politowski, Systems Analyst, Lansing, Mich.

"Codasyl should have Cobol plus Communications and Mass Storage only." — Richard A. Reader, Programmer, Palo Alto, Calif.

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Sightings of Creature Compiled

Computers Join Search for 'Bigfoot'

By Molly Upton

Of the CW Staff

EUGENE, Ore. — Man has been attempting to capture a Bigfoot-Sasquatch for several years, and the leading organization in this effort, the North American Wildlife Research Organization, is using a computer to compile data from different sightings to discern patterns in the creature's habitats and life-style.

The Bigfoot-Sasquatch is a giant, hair-covered, human-like creature said to inhabit remote areas of the Pacific Northwest. Footprints have been found as large as 18 inches, according to Ronald Olson, director of the organization. Also, smaller footprints have been found, indicating there is more than one such animal.

Rarely Seen

The creatures have rarely been seen, and often the reports are of footprints, which are "entirely different" from those of a bear. They resemble those of man, except they are larger and very flat-footed, he added.

Using computer time and programming offered by a volunteer in Salt Lake City, the nonprofit organization has compiled data on about 300 sightings, including some reported as early as about 1836, Olson said. The computer "is speeding things up

quite a bit" by spotlighting longitudes and latitudes which seem to point to areas of high frequency sightings over the years. The organization will use these as a guide in sending people out rather than basing their plans on sporadic sightings that occur once and never again, he noted.

The organization has labeled "preset" areas, and has now stationed a man in one region in which several sightings of Bigfoot have been reported.

There are other areas in which Bigfoot seems to show up repeatedly at a certain time of year, and the organization sent a group into that area where Bigfoot had been reported every June for four years, but without luck.

Sensing Techniques

"We're trying to develop techniques of sensing these things before they get there. The computer has helped a great deal, because it gives you a basis to go on. About 95% of the sightings are fraudulent or questionable. Of what seem to be facts in the computer survey, we now have what we think to be consistencies in all true sightings. We can apply these consistencies to all sightings reported to figure out if it might be questionable or fake," Olson said.

Olson's group is revising the

form used to report sightings, concentrating more on specific information such as altitude, latitude and longitude rather than name of a city, temperature, cloud cover, terrain, ground cover, date and activity of the animal. This should enable more information to be entered and retrieved, he noted.

Although the group has been using a computer "on and off" for about a year, Olson would like to see more use made of it.

"We have enough information now that if it were really minutely screened down, we'd come up with some real facts." There are 300 more sightings which have not been fed into the computer, he said.

Actually, a much greater percentage of the old reports shows a higher consistency with what the organization believes to be factual current sightings than reports turned in nowadays, Olson said.

The organization would like to capture a Bigfoot, study it briefly, and turn it loose with a transmitting system that would enable man to track it and study its patterns closely.

Olson thinks the study of Bigfoot can teach man about his past. He also fears that since verified reports were more frequent in the past than now, Bigfoot may be on the verge of extinction.

Student Brings DP to Football Squad

MILLERSVILLE, Pa. — Millersville State College feels it is on the way to becoming the terror of its football league because of a computerized scouting and analysis program developed by a student in the band.

The idea was not new — it started in early 1971 when Tom Bradbury, a junior, enlisted the help of Tom Houser, the director of computer services.

Bradbury studied a similar program used at Slippery Rock College and, based on this, started coding his own system. His first idea was to create a program that could be used for scouting reports after each game and before the next opponent.

It was then that Bradbury made his discovery: "Not only could he feed scouting statistics into the computer and see what type of plays a team used in certain situations, but he could feed plays during the game and quickly get statistics to show which plays were working best and where the opponent was

making his greatest gains."

When Bradbury presented his idea — which in time may be immortalized at Millersville State as "Bradbury's First Law of On-Line Offense" — the coach had a remote terminal installed in the "Marauders" press box. A telephone was connected to the playing field for input.

Because Bradbury's band duties keep him occupied, another student, Fred Theobald, types in the information for a computer in Ann Arbor.

Back from the computer comes the analysis to the assistant coach who relays the information down to the field.

Major Advantage

The major advantage of the system comes at half-time when a printout is produced showing which plays worked best against which defense and what were the defensive lapses.

Bradbury's program analyzes how many first-down situations occurred, where the holes were,

down and distance tendencies of both quarterbacks, and which defenses were the most popular under which circumstances.

Shoremens Dial for Jobs

MONTREAL — The Maritime Employers Association (MEA) has instituted a computer system for assigning longshoremen to ship cargo jobs in the Port of Montreal.

Under the system the 51 companies using stevedores in the port will place their manpower needs at 4 p.m. for the following day. The computer will then determine which men and how many are best suited for the freight-handling jobs available. The men will receive their assignments by telephoning the offices of the MEA.

The computer will store information on longshoremen's special skills, age, weight, height, etc. and will also administer annual payroll for the 3,200 longshoremen.

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Random Notes

Updated 'DOS Asap' Spools, Balances 3 User Partitions

DANBURY, Conn. — Even without multiprogramming support, DOS/360 installations can use version 2.0 of the DOS Asap package, from Universal Software Inc., for asynchronous spooling of real or imaginary card readers, printers and punches. The update includes support for 3330, 3505 and 3525 peripherals.

In multiprogrammed mode, the package provides partition balancing and dynamic resolution of device assignment conflicts for three user partitions. The full reader/writer implementation of DOS Asap is available on perpetual license for \$3,500; a writer-only package costs \$2,900. The company is at Commerce Park, 06810.

Studies of Fortran Execution Reported by Source Statement

PHOENIX, Ariz. — Fortran programmers can run execution-time studies of their work with Fortune, a program now available from Capex Corp. Fortune reports how a program being tested ran, in terms of the user's own source coding.

Designed for OS/360-370 installations, Fortune was acquired by Capex from United Data Services Inc., Palo Alto, Calif., and is available on 12-month lease for \$450/mo. Capex Corp. is at 2613 N. Third St., 85004.

New Culprit Versions Released

BOSTON — Report writer/data retrieval systems with processing modules for particular non-DP users, Portfolio-EDP Reporter and Market-EDP Reporter, are variations of the Culprit "output processor" from Cullinane Corp., One Boston Place, 02108.

"Portfolio" includes logic for trust or brokerage managers, "Market" supports marketing and market research efforts. Each runs in 50K bytes under DOS/360, or 80K bytes under OS. Written primarily in Assembler, they are available under two-year lease arrangements for \$15,000 each.

Mortgage Program Runs in 32K

MONROEVILLE, Pa. — The Mortgage Loan System (MLS) from Digital Systems Corp., provides multi-branch support for banks using a minimum 32K, three disk IBM 360. It provides accounting and balancing routines, daily posting journals and delinquency reports on a branch-by-branch basis.

MLS also generates amortization schedules for each new account and calculates interest on a daily basis for more accurate rebates in case of early payoff. The package price of \$5,000 includes Cobol source code and two days of on-site support, a company spokesman said. The firm is located at Suite 317, Monroeville Mall, 15146.

IBM Text Reminds VS Users:

Programming Style Can Control Paging

By Don Leavitt
Of the CW Staff

WHITE PLAINS, N.Y. — IBM's virtual storage systems generally won't go into "thrashing mode" no matter how much paging they are called on to do, but there are things programmers working with any virtual system can do to cut down on paging, anyway, according to a current IBM student text.

Introduction to Virtual Storage in System/370 (GR20-4260-0) notes that the VS operating system monitors the paging rates as it handles transfers between real and virtual storage. If the rate gets too high, the system temporarily halts a low priority task and seizes the real storage frames used by it to handle more critical work more effectively.

A key objective of programming techniques in a virtual environment is the reduction of paging, but the amount of time and thought that should be given to style depends, the text says, on the expected usage of the program.

Frequency of use and expected running times should both be considered, the author notes.

Programmers should be able to limit paging by following three general rules, he said. The first relates to what the author calls "locality of reference" and simply stated, says to keep things used with each other near each other.

The second rule runs counter to the assumption, made by many users, that programming need not be as tight under

VS as under real storage environments. Even under VS, the text warns, the programmer should keep as small as possible the amount of real storage required for a program to execute.

Finally, the user should be careful about the validity of references. Don't retrieve useless data when you reference storage, the manual urges.

To gain good locality of reference, processing should be sequential for both code and data. Error handling or unusual-situation routines should be separated from the main section of the program. Preferably, the author says, they should be separate subprograms.

If a short subprogram is used only once or twice in a program, and it is not an unusual-situation routine, the coding should be included directly rather than being called by the using program.

In a note directed perhaps more to operators than to programmers, the text

says that subprograms should be loaded (in the virtual partitions) near the programs that use them.

Whenever possible, program data should be arranged so that it is accessed sequentially in memory.

To minimize real storage requirements, users should load frequently used subroutines near each other in virtual storage. By the nature of the control system, these will tend to stay in real storage and be available without paging.

Don't use overlays; they don't reduce paging. System I/O (paging) will work faster than user-initiated I/O in any case, the author added.

Under VS, users should avoid long searches for data. They should expend virtual address space, which is very large, to reduce the need for real storage. Use data structures that can be addressed directly, like arrays, rather than structures such as chains that must be searched, he said.

PDP-11-Based 'NOS-11' Manages Multiple On-line Applications

CAMBRIDGE, Mass. — Several large, multi-terminal on-line I/O-bound applications can be efficiently processed simultaneously on a DEC PDP-11 mini with the NOS-11 system software from National Information Services Inc. (NIS). Key to the effectiveness of the package,

which is a supplement to DEC's Disk Operating System rather than an operating system in its own right, is said to be a highly refined resource management algorithm.

This includes the use of transient modules within NOS-11 to conserve memory, and overlapping seeks on all disk drives to speed access times. At the same time, processing is overlapped with terminal and disk I/O to use processor time efficiently, NIS said.

NOS-11 supports most of the software available from DEC for the PDP-11. Beyond that it supports multiple CRT terminals, multiple printers, multiple cartridge disk drives, teletypewriters, card readers, paper tape readers and punches, and the miniature DECtape units. An interface for industry-compatible tapes is expected in the near future, an NIS source said.

Under NOS-11, a single copy of an application program services all terminals to keep overhead-per-terminal to a minimum.

Scheduling by NOS-11 is geared to handle large volumes of terminal I/O, plus the even larger amount of disk I/O generated to serve the terminals. NOS-11 provides a multi-task environment.

Many users may share access to a single data base, with a locking feature that prevents more than one user at a time from attempting to update any data field.

In a multi-user mode, the task management modules give rapid and nearly equal response times at all terminals, NIS said.

NOS-11 is available for \$25,000 from 675 Massachusetts Ave., 02139.

Sort Uses Disk Space Fragments

TEANECK, N.J. — A new version of the Synchronized Sort (Synchsort II) from Whitlow Computer Systems Inc. includes features designed to improve both the operational and performance functions while sorting in a multiprogrammed environment.

When Synchsort was announced last year, benchmarks of its use in a single program environment indicated it could be twice as fast as IBM's sort/merges.

Synchsort II supports the use of fragmented, non-contiguous areas on disk, without requiring any additional effort on the part of the operator.

Synchsort II releases any space it determines will not be used during a sort operation, as soon as the read-in phase is complete. It also utilizes the Secondary Allocation capability of OS/360 to go beyond any extents that have been specified, if the current operation requires more space.

The use of Secondary Allocation can be pre-authorized through JCL entry, or Synchsort II will default into the capability if the need arises, Whitlow said.

Synchsort II collects statistical data to aid the user in planning his sorts. The

data may be accessed through an SVC or through a special program.

A new operational mode reduces potential device conflicts in a multiprogrammed situation. Dynamically it senses the pattern of use on each device assigned to the sort.

It works with a single device at a time, loading it with string after string of data, as long as it is the device with the least demand from other jobs.

As soon as the demand pattern changes, Synchsort II shifts to the new least-used device. This approach may cost the user some time in the sort itself, but it improves the overall throughput of the system, Whitlow said.

A Control Index feature allows the user to modify the efficiency of the channel utilization.

The OS/360-oriented package requires only 30K bytes of storage but because of its file handling techniques, it cannot be used on the 360/40 or 370/145. Synchsort II will be available in January for \$3,000 on a one-year lease, or \$6,200 on a three-year agreement.

Whitlow Computer Systems is at 1029 Teaneck Road, 07666.

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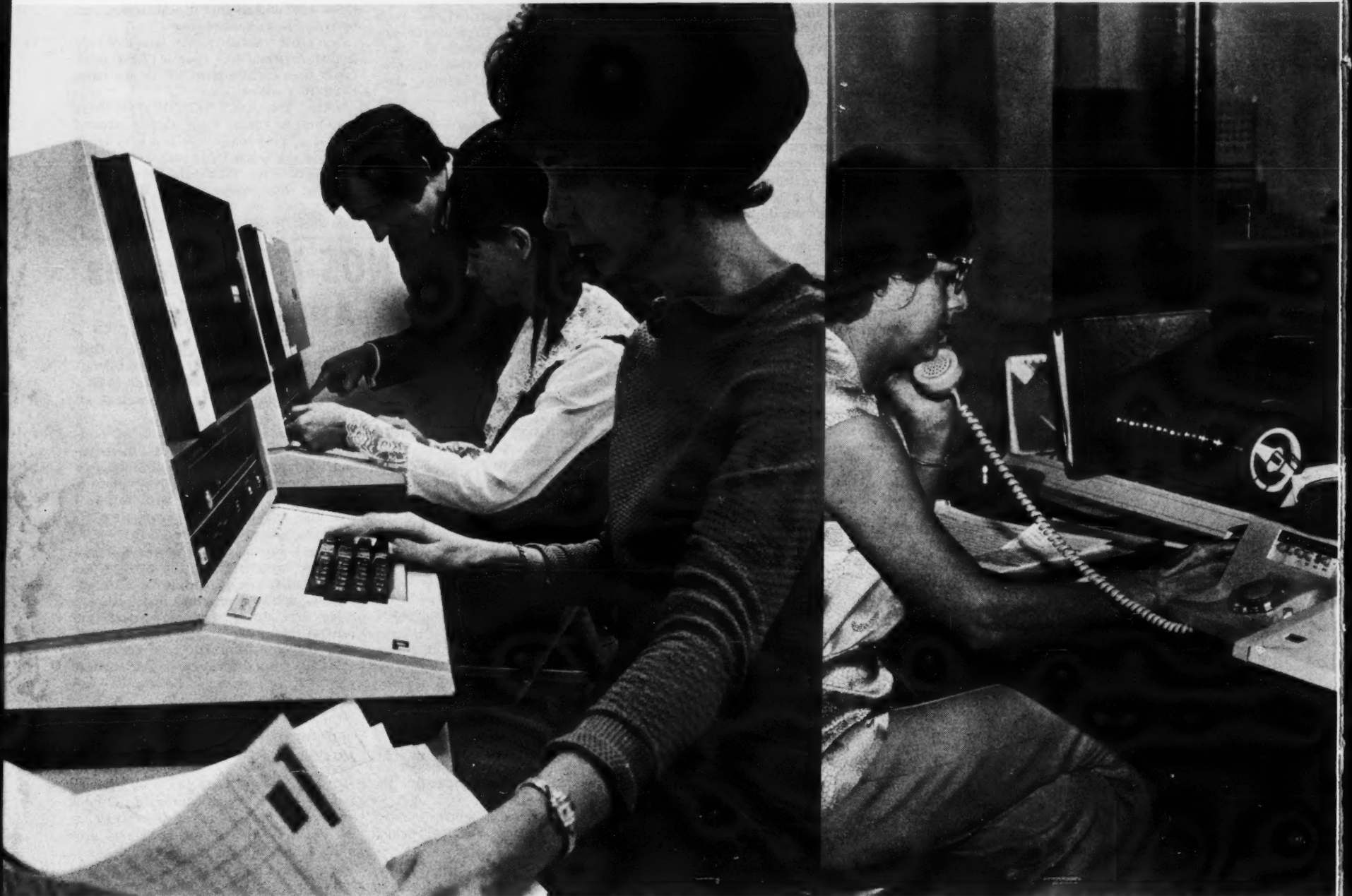
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Mastercraft Industries, Inc., Denver. One of the largest manufacturers of kitchen cabinets, with facilities and sales offices in Dallas and Phoenix.

Mastercraft's present configuration in the Denver office includes a 4311 Magnetic Data Recorder for data entry and transmission, a 4301 for data entry and a high speed line printer. Both branch plants have installed 4311 terminals and high speed line printers.

Ken Sandoval, Mastercraft's controller, says the company switched from an on-line system using a Data-Phone to the Singer* system because it provides precise quantity-item inventory control. However, it is also being used for accounting functions at all locations, including accounts receivable, accounts payable and payroll. And they're considering adding a magnetic data central pooler for inventory tracking.

Has it made a difference? Sandoval is delighted. "Tape input is much faster... We realize quite a savings in expensive CPU time alone... and the absence of problems has alone justified the change to the 4300 system."

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The offices and the Data Center are each equipped with a 4311 Data Communications Unit. Data is transmitted over the dial-up telephone network daily.

The average office transmits 156,000 characters—or 8400 record blocks—to the Center every month. The average office can transmit a whole day's transactions to the Data Center in 15 minutes or less: eight times faster than with the previous punched card system. The Data Center recorder is now receiving over 200,000 records per month, and has the capacity for over one million records during any given month.

A printout is produced and mailed to each office daily from the Center.

Input into the Center's IBM System 360 is 45 times faster than with the former card system, which used both a keypunch and card reading terminal at each office. Costly mainframe sorting and conversion has been eliminated.

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Management indicates that the new 4311 terminals were justified on cash flow alone.

4300 Series Magnetic Data Recording System equipment is designed and manufactured by PERTEC, one of the largest manufacturers of key-to-tape systems in the world. The product line is a result of high technology engineering and extensive product testing. Each unit is manufactured in PERTEC's ultra-modern electronic manufacturing facilities under stringent quality controls which assures high quality reliable performance.

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Extended Project Management System Includes Planning, Historic Analysis

NEW YORK — Many project management systems on the market have been good — as far as they go, but none have included all the functions necessary for a full control system. That is the opinion of Aucton Computer Enterprises Inc. (Auxco) which recently introduced its own project management system to fill the gaps left by the other packages.

Implemented on 360/370 equipment, the system is divided into five subsystems: "diction-

ary" maintenance; planning; control reporting; cost analysis; and historical analysis.

The dictionaries are the key to the system. They contain user-derived definitions of work procedures, time estimates and resource requirements.

The planning subsystem allows the user to simulate work to be done, resources required and time. It generates alternative schedules based on a modified Pert model built into the system. Standard costs, modified to re-

fect a user's experience, are applied to develop a budget. Once the plan is finalized, the system documents the time, cost and work to be accomplished for management approval.

If the plan is approved, the subsystem is again used, to develop detailed work assignments and network schedules showing critical path and slack time.

The control report subsystem edits progress and attendance data against all projects and work activity in progress and generates management reports and the employee's progress/attendance forms for the next reporting period.

While the cost analysis subsystem provides a summary of project costs by resource category in both client and department sequence, the historical analysis subsystem monitors the system's effectiveness in estimating time needed to complete assignments and quantity of resources required.

It provides a record of staff performance and an analysis of the trends in trouble areas reported across project lines.

The Auxco system runs on 360/40s and 370/155s under both DOS and OS, requiring a 120K partition, five sequential and one direct access peripherals. Written in ANS Cobol, it is also configured for Univac Series 70 equipment under TDOS.

Purchase price ranges from \$12,000 to \$30,000, depending on how much of the system is acquired. Lease prices range from \$600/mo to \$1,700/mo. The firm is at 1345 Avenue of the Americas, 10019.

Reduce your equation or data analysis to a picture. With PPG contour-plotting programs.

PPG Industries has developed and used two FORTRAN programs that plot contours.

The first is called ZAPMAP.

Using the 1403 printer, it produces contour plots of constant response for regression models with up to fourth-order polynomial terms. The program accepts a maximum of 29 independent variables and one dependent variable. If transformations of the original variables are required, ZAPMAP can obtain plots in their original units.

The program uses coefficients of a function as input and plots contours of constant response for two independent variables. At most, four of the independent terms in the function may be varied.

A second PPG Industries program, XYTPLOTS, plots a continuous function T of two independent variables (x and y) on a CalComp plotter at user- or computer-selected values of T.

To obtain these or other IBM 360/370 programs from PPG, use this coupon.

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IBM Plans APT For 370 in '73

WHITE PLAINS, N.Y. — Manufacturers with 512K real or VS partitions on 370 CPUs will be able to handle a range of numerically-controlled machining chores with three programs expected from IBM late next year. All three process statements are written in Automatically Programmed Tool language (APT) can generate cutter location data for NC machines.

The Basic Positioning package (APT-BP) handles point-to-point and simple line circle machining. Intermediate Contouring (APT-IC) adds more complex two-dimensional operations, and Advanced Contouring (APT-AC) includes three-dimensional and multi-access operations.

All three operate under OS/VS or the Virtual Machine Facility (FM/370). APT-BP will be licensed for \$150/mo, APT-IC for \$300/mo and APT-AC for \$500/mo.

'Mark IV' Linked to 'GTFM'

SOUTHFIELD, Mich. — Mark IV provides its users with table look-up facilities, but users can work with larger, more flexible tables through a new interface to the General Table File Maintenance (GTFM) software available from Computer Services Corp.

The interface, called M4TBLS, is an own-code routine written in 360 Assembler language which responds to Mark IV requests and works with the GTFM access module for actual table file processing.

GTFM provides a means of maintaining any tabular data, and a means of accessing the tables. These facilities have previously been available only to programs in IBM-supported languages. Now tables controlled through GTFM can be used in both Mark IV and Cobol programs, the company noted.

The GTFM facilities are supplementary to and not a replacement for the table look-up capabilities of Mark IV, a spokesman stressed, so programs need not be rewritten just to accommodate the new interface.

M4TBLS is available for \$54/mo for 36 months, or \$1,500 for a fully paid three year lease. The basic GTFM software costs \$171/mo or \$4,750 for three years. The firm is at 23225 Northwestern Hwy., 48075.

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For Generating, Debugging**'Axiom' Packages Aid Cobol Programmer**

LOS ANGELES — Cobol-based installations with IBM 360/370 or Honeywell CPUs gain a broad range of program development tools with a pair of packages, Axiom One and Axiom Two, from Dimensional/Export Software Corp.

Axiom One is used for debugging, and maintenance work after a program has been initially developed and compiled. It generates either a cross-reference list of all data names or a relatively simple, but still effective, flow-chart of any subject program.

Axiom Two is a Cobol source program generator that creates the logical skeleton of a program, including all divisions, from a few lines of parametric entries. Normally this basic program would be supplemented by the user's own Cobol coding before compilation is attempted, a spokesman for the vendor said.

Although the two Axiom packages complement each other in their capabilities, they can be used independently he added.

The cross-reference lists produced by Axiom One include mnemonic codes to identify the type as well as the location of each reference to a given data name.

By showing the user where data is modified or moved, rather than used just as a basis

for a comparison, debugging is aided immensely, the vendor claimed.

Axiom Two — the generator package — can produce the skeleton of three types of programs: those that are essentially file-to-file data transfer operations; those that involve file updating; and those that create reports from input files.

Each of the packages is written

in a low level ANS Cobol and should be easily adaptable to a variety of CPUs.

Currently each fits within a 65K byte IBM environment under either DOS or OS/360. Axiom One has been installed on a 32K Honeywell mainframe.

Axiom One costs \$4,000 and Axiom Two, \$4,800. Lease-purchase plans are available from 15910 Ventura Blvd., 91316.

Data File Handling Eased With Telex 5848 Software

TULSA, Okla. — Users can do as much or as little as they want in messaging data files on the Telex 5848 Offline Printer System, with the three-stage software support now available from the company.

They can, for example, simply transfer print tape images from mag tape to paper with no special effort by the programmer, or use a data file as part of the input for a run controlled by a good deal of programming logic.

Telex' standard offline print program handles normal OS or DOS print tapes from a 360/370 and requires no programming by the user. The tapes may be blocked or unblocked, with or without labels, but each record must be 133 characters long, including the first-position print control character.

Since both the input and output of the "standard" program are predefined, this program is distributed in object form and can be loaded directly into the 5848.

Compiler I and Compiler III programs, by contrast, require compilation on a host 360/370, before they can be used on the Offline Print System.

Compiler I allows the user to

alter parameters to work with records that are other than standard length or have the forms control character in an unusual position.

It also allows the user to perform skips of more than three lines, or selectively print records from a file on the basis of a one-character code.

Compiler III goes further: it allows the user to GET individual records from a tape, and study them in detail before PUTTING them to the Printer. The user can write detailed program logic tailored to job needs.

Data handling instructions available through this cross-compiler include moves, compares, Boolean logic (ANDing and ORing) and character translates.

The station has enough core and control logic to hold and selectively use up to 16 separate Compiler III-based programs, through operator key-ins, the company claimed.

The standard program is available for \$10/mo or \$360 purchase. Compiler I costs \$25/mo or \$900 and Compiler III costs \$40/mo or \$1,440. The cross-compilers operate under either DOS or OS/360.

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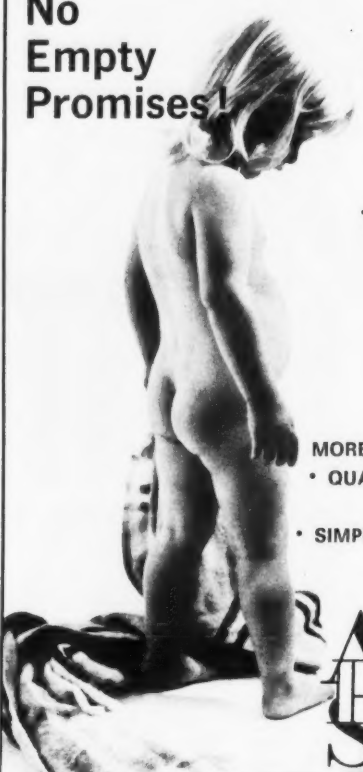
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SPOOLER provides an economic printer output spooling routine for DOS installations. It allows the printing of output to be independent of the generation of the output. The technique employed by the SPOOLER is to write the output onto disk as it is being generated, then write from disk to printer as the printer becomes free — performing all of its functions in a partition as small as 4K.

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BCCXREF will reduce by over 50% CPU usage for the generation of the CROSS REFERENCE listing provided by ANS COBOL. BCCXREF will significantly reduce elapsed time in the compiler partition or region, increase throughput, and allow greater system usage for other purposes.

DOSRELO

DOSRELO provides a method of making DOS problem programs self-relocating. DOSRELO accomplishes the self-relocation capability for all programs, regardless of the language, by adding entry point logic to the object code of the program before the Linkage Editor catalogs it on the Core Image Library.

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The Computer Installation Management System (CIMS) provides a method to supply management with pertinent information in the utilization of their data processing hardware. CIMS accepts data collected by the System Management Facility (SMF), formats the data and presents the data in varying sequences and formats. Reports for job accounting, multi-programming throughput, hardware analysis, and others are provided.

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Data Briefs

Data Switch Handles Up to Eight Interfaces

ROCKVILLE, Md. — Hekimian Laboratories has expanded its Model 64 communications switch to handle up to eight interfaces per unit.

The Model 64 allows operators to transfer data circuits, modems, and CPU inputs by using local or remote push-button control. Multiple units can be connected for larger switching requirements. Available options include synchronized switching of the telephone side of the modem and direct CPU control of interface selection.

The Model 64 is RS 232-compatible and includes illuminated push buttons to verify channel selection. The unit is priced from \$395 depending on configuration. The firm is at 322 N. Stonestreet Ave., 20850.

NCR Adds Cassette Unit To 270 Financial Terminal

DAYTON, Ohio — NCR has added its 761 cassette recorder to the 270 financial data terminal so the system can capture and store data in either the on-line or off-line modes.

The cassette version of the terminal is designated the 270-2 and includes a read-only memory with 8K characters. The 270-2 costs \$10,200 or rents for \$280/mo. The cassette recorder as a separate unit costs \$1,650 and rents for \$50/mo. First deliveries are scheduled for second quarter 1973.

Terminal Replaces 2780s

PITTSBURGH, Pa. — Westinghouse has introduced a batch terminal that can be used as a replacement for the IBM 2780 Model 1.

The terminal is designed for use by low-volume, low speed users who operate less than four hours a day on low speed dial-up or leased lines.

The model 1550/2780 remote batch terminal supports binary, synchronous communications at 2000 baud (dial-up) or 2400 baud (leased line).

The system includes a minicomputer with 4K words of memory, an operator's console, data set interface, 300 card/min. reader, and a 250 line/min printer.

Purchase price is \$23,500. Included in the \$650/mo leasing price are maintenance and insurance from Westinghouse Building, Gateway Center, 15222.

Unit Handles Graf/Pens

SOUTHPORT, Conn. — Science Accessories Corp. is offering a multiplexer which permits up to 14 of its Graf/Pen sonic digitizers to input data to a single data bus.

Multiplexer chassis and control cost \$1,100. Each additional channel costs \$275 from 65 Station St., 06490.

Character Sets Differ

APL/Ascii Terminals Provide Graphics

By Ronald A. Frank
Of the CW Staff

NEWTON, Mass. — With the recent announcement by Teletype Corp. that it will add an APL character set to its Model 38 teletypewriter, users now have several APL/Ascii terminals available.

There are currently two basic ways to generate APL characters on a data terminal. The earlier version is based on the IBM 2741 type terminal and includes the type of replacement unit developed by I.P. Sharp Associates in Canada. This type of APL terminal transmits either BCD or Correspondence code usually at slower speeds of 15 char./sec in a Selectric-type printer. The I.P. Sharp VDT-100 has the advantage of displaying the APL characters on a CRT screen.

Significant Advantages

But the newer terminals give users significant advantages over the 2741 APL devices. One of the primary advantages is the inclusion of graphics with the APL character set. The Tektronix 4013, which is scheduled to be delivered in December, is a storage-type display. This means that the image on the screen is fixed until erased by the operator rather than being continuously refreshed on a CRT display.

One company that has a CRT APL/Ascii terminal is Conographic Corp.

In the printing APL/Ascii terminals category (without display) are the Memorex 1240 and the Teletype Model 38. But the choice for users is not merely between display or non-display types. The character set generated by the terminals also has some built-in variations.

The basic APL character set has 88 symbols. But the Ascii code has 94. So when the APL character set is "overlaid" on an Ascii terminal, there are six extra unused keys.

To capitalize on this added capability, Jim Ryan, manager of interactive programming languages at Burroughs, and Larry Breed, vice-president for development at Scientific Time-Sharing Corp. have devised six characters to be included in the new APL/Ascii terminals.

At present, the six characters are not part of the APL language. In fact they cannot be generated on most of the new terminals since a character error will result. But the potential is there waiting for the APL programmers to come up with standardized usage.

The six characters include a diamond, dollar sign, right and left tack, and right and left brace. And although they have

no official status at present, Breed explained why they were chosen.

The dollar sign is expected to be important for business-oriented APL users; the diamond will probably be used for forming new overstrike characters; the tack symbols will be used for plotting applications; and the right and left brace will be useful in describing sets or for list processing.

Most of the new terminals transmit Ascii signals that correspond to the proposed APL key positions. But Teletype has made some minor changes that restrict the Model 38 APL/Ascii unit to talking only to other similar terminals.

But for data users the APL/Ascii terminals mean higher transmission speeds and the added graphic capability which is not available on the IBM 2741. The extra six characters have been proposed before APL user groups as a standard. So far most suppliers, except Teletype, have introduced terminals that follow the pattern introduced by Ryan and Breed.

No IBM Position Yet

Up to now IBM has taken no position on the new characters. It offers Selectric type balls for either BCD or Correspondence code on its 2741 version of APL.

But even if the extra six characters do not enter the official APL character set in the near future, the new APL/Ascii terminals offer a viable method to increase the capabilities of APL communications networks.

One of the first companies to offer an APL/Ascii time-sharing service is Scientific Time-Sharing Corp. which now has the service in selected cities. Others will probably follow. In addition, users with in-house systems will probably begin using the new terminals.

Vendors reported developing versions of APL/Ascii devices include Burroughs, CDC, Delta Data Corp., Anderson Jacobson Inc., Novar and others.

360 Communications Package Simulates Line Characteristics

WILMINGTON, Del. — IBM 360 users can study the effect of as many as 25 terminals on a single telecommunications line with the Linesim data line simulator package from International Telecontrol Corp. (ITC).

The package uses discrete simulation techniques to predict message response times for various line throughputs. It can take into account changes in line, traffic or system parameters that can affect the response time.

Line changes can include revised line speeds or the availability of more or less lines without any change in speed. The use of remote multiplexers or data concentrators would also be taken into account in this range of parameters.

Traffic changes can include variations in volume, but also alterations in the average length of messages and the user's requirement for response times as well.

Results available from the simulation — in both tables and graphic format — include line utilization, input and output message length distribution, and message delay statistics. By playing "what if" with the input parameters, the user can determine the effect of different plans even before equipment is actually ordered.

Linesim is particularly useful, ITC said, for studies involving lines with multi-drop

ASR terminals, traffic that exhibits wide length distribution, and special terminals handling algorithms.

Written in GPSS/360, Linesim runs in 20K to 30K bytes (depending on the size of the network under study) under either DOS or OS/360.

It is available from ITC on a minimum one-month lease for \$200/mo. Help in interpreting the Linesim results will be provided if requested, the company said from 1601 Concord Pike, 19803.

Message Switching System Can Handle 256 Ports, TTYs

HOUSTON — A computer-controlled message switching system to store and forward teletypewriter messages and high-speed data has been introduced by Texas Instruments Inc.

Designed to function as a stand-alone communications system controller, the EMS II features 256 communications ports, the Model 980A computer, a Multiplexer Communications Processor (MCP) and a variety of communications interface modules and peripherals.

The system operates with mixed trans-

mission rates, circuit types, line disciplines and terminals.

Other features include mnemonic addressing, group codes, alternate routing, message priority, message numbering, date and time stamp, acknowledgement to senders, and message retrieval.

Prices for single switcher systems range from \$50,000 to \$500,000 depending on options, number of communication circuits and customization. Initial deliveries are scheduled to begin at year end 1972. The firm can be reached through Box 1444, 77001.

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For 360 Users

'Acres' Controls Polling Work

PHILADELPHIA — The Automated Call Remote Entry System (Acres) telecommunications software now available from Trilog Associates Inc. is designed to give IBM 360 communications users polling capability with minimal core consumption.

Acres supports editing of data as it is received from a number of remote terminals, but has no coding related to transmission out to the field locations. As a result it requires only 12K bytes under DOS/360 or 18K under OS, Trilog said.

Working through an IBM 2701 line controller or similar unit, Acres polls and initiates transmission of data from virtually any type of magnetic-tape cassette-based terminal. The polling sequence is controlled and can be modified by user-defined entries in an internal Acres table.

Formats Information

Once polling starts, the system detects and corrects transmission errors, and formats and stores data received for subsequent processing. Acres accumulates counts of data load and transmission problems identified by terminal, and formats this in-

formation into reports that can be used for trouble shooting or reconfiguring of the network, a Trilog source said.

To protect against machine failure, Acres also includes restart procedures. Once the hardware system has been restored, the software reestablishes the message transmitted when the interruption occurred.

Any Character Set

The user would have to create translation tables needed to convert any character sets used by non-standard terminals. Beyond

that, he has the option of exiting from Acres logic to handle the editing of any special message headers.

The system has another advantage for the DOS user, Trilog noted. It does not require the Timer facility so it is available for the users application program if they need it.

Written in Assembler language, Acres costs \$15,000 for a three-year lease, or \$150/mo under a rental agreement, which also requires a one-time installation charge. The firm is at 1700 Market St., 19103.

Tapecomm Transmits Taped Data

FAIRFILED, N.J. — Digital Computer Controls Inc. has introduced the Tapecomm system which allows the transmission of IBM-compatible data from one magnetic tape unit to another. The system can also be used to transmit data directly to a front end processor.

The system includes a Digital Computer D-112 mini with 8K storage, an IBM-compatible tape drive, communications interface, and software. Tapecomm is said to be self-contained, performing all signal conversion functions.

The system can operate with Bell 201 and 202 data sets or their independent equivalents. It can operate in manual or automatic answer mode at speeds up to 9,600 bit/sec. The system can handle Ebcidic, Ascii, and other data codes on seven or nine track tape at densities of 556, 800, or 1,600 bit/in. An 800 bit/in. system costs \$11,947 and the 1,600 bit/in. version costs \$14,337.

First deliveries are scheduled for February, 1973, from 12 Industrial Rd., 07006.

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designated Model 44 and has one removable and one fixed disk (capacity is 100,000,000 bits). In addition to increased capacity, performance characteristics include 38 millisecond access speed, 2500 KHz transfer rate and 2400 rpm disk speed. Operating temperature range is 50° F to 104° F, permitting use in normal office environments. The new drives use the 5440

Novar Terminal Has Financial Orientation

WHITE PLAINS, N.Y. — GTE Information Services has added a financial terminal to the Novar line. Called the Novar 5-43, the unit includes a Selectric typewriter and a keyboard that allows operation in a "transaction" or data entry mode.

The terminal contains a buffer which is said to eliminate "time-outs" during the receive mode. The 5-43 has a split platen and can operate in both individual station and broadcast mode for polling and addressing applications.

An automatic line diagnostic checker feature allows the terminal to echo transmissions back to the CPU for unattended testing. The terminal operates at 75 or 134.5 bit/sec and costs \$120/mo or \$4,800. GTE is at 4 Corporate Park Drive, 10604.

Mag Cartridge Unit Attaches to 33, 35 TTYs — Interface Included

PHOENIX, Ariz. — Wabash Computer Corp. has introduced a magnetic tape cartridge unit that can be used with models 33 and 35 TTYs.

The unit includes an RS232 interface and operates at data rates from 110 to 2,400 bit/sec. The device uses 3M magnetic tape cartridges and has a tape speed of 30 in./sec.

Data Block

Data received by the unit is buffered and then written on tape as a data block. Data can be written in a compressed mode. Data is recorded on the cartridge at 1,280 bit/in. with a total capacity of 280K char. The system costs \$2,500 from the firm at 10202 N. 19th Ave.



Single Source for Terminals Centralizes Support

SOMERVILLE, Mass. — For most DP users, the need for terminals is a continuing requirement.

For the DP installation with a variety of terminals in-house this often means that a mix of support personnel has to be on-call to service the equipment.

But one company believes it has found an answer to this problem. Known as National Data Industries, the firm leases a variety of terminals to users and supplies its own support staff to maintain the units.

National currently supplies teletypewriters, CRTs, tape cassette units, portable terminals,

serial printers, and other devices to users.

Maintenance Good

The maintenance is good, according to Kerry Overlan, assistant manager for telecommunications at Boston's First National Bank. "If they can't fix it here we get another machine usually without delay," he said.

"Primarily we use 10 to 30 char./sec terminals for time-sharing input. Occasionally we need a portable terminal or a CRT and they can supply those also," Overlan said.

"There is always the problem of having several vendors on file

for different types of terminals," according to one user. "But with the National Data approach if we want a high speed, low speed, or portable terminal, we call one source."

Additional Flexibility

In addition this user felt that terminals supplied by National gave him additional flexibility in equipment changes. "We are under contract with them for one year but we can upgrade or downgrade our equipment without penalty."

In contrast, equipment supplied by one vendor can only be replaced by another product

from that company, the user said.

Other Vendors

While most National users call the service good or "responsive," they say they are not paying a premium for the support. "They are not far from other vendors in price," one user said.

Another user was more specific. "Some vendors were lower in price, but their service didn't prove out. These suppliers might be \$5 or \$10/mo less but it costs you more in the long run," he said.

Most of the devices leased by National are available on a sale-

only basis from the vendor. But National provides the equipment on a lease arrangement with maintenance to the user. Normally the firm provides equipment on one and three year leases, but upgrades during existing lease are possible.

At present National serves users only in New England. But the concept of a single multi-terminal supplier may spread to other areas.

Badger Offers RJE Terminal For 360/370s

RICHMOND, Calif. — Badger Meter Inc. has introduced a remote job entry terminal that can replace IBM 2780 and 3780 systems. Called the DTS-100M, the system is compatible with 360/370 applications and features an operator console, printer/keyboard, 600 card/min reader and a 600 line/min printer.

Lease prices start at \$798/mo including maintenance and standard software packages. Optional equipment includes magnetic tape capability and software for upward expansion. Badger is at 150 E. Standard Ave., 94804.

Planning Guide Aids Digital Users

RAMSEY, N.J. — The Center for Communications Management has a planning guide for digital data communications services. The research report covers and compares services now available or planned by AT&T, Western Union and Datran.

The functional capabilities and limitations of digital services are discussed in the guide together with interface requirements, system control considerations and error detection/correction trade-offs that the user must make.

The guide is available through Box 324, 07446.

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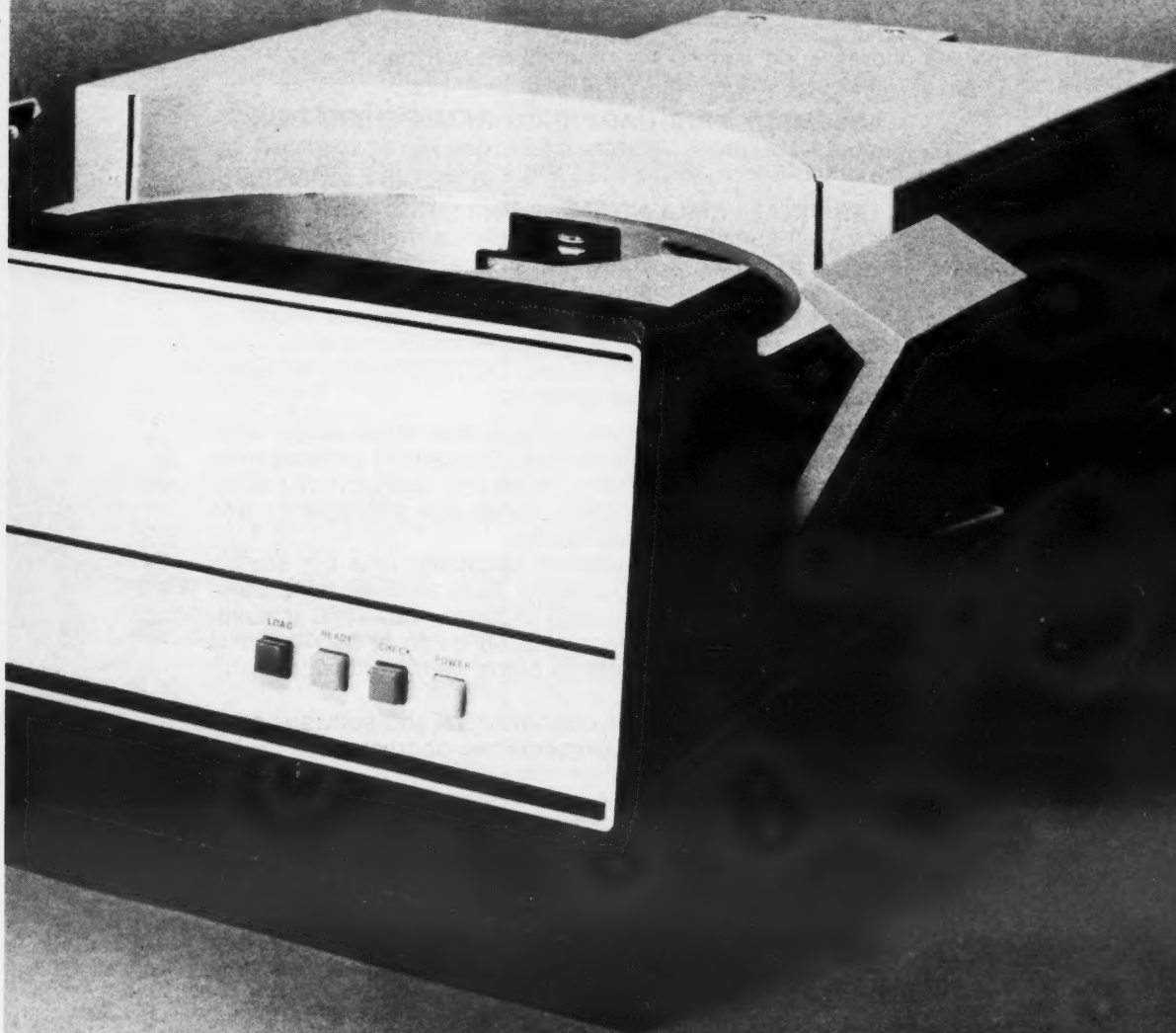
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Other mini computer manufacturers talk about their software: Datapoint delivers

The Datapoint 2200, a unique combination of powerful computer, display, and dual cassette drives, has established an enviable record as an all-purpose computer and communications system. Its success, however, is not based on hardware capabilities alone.

Many computer professionals have been pleasantly surprised to discover that the Datapoint software catalog makes available more comprehensive offerings of program-generation software than most other mini computer makers. And all the programs are created and run on the Datapoint itself — no other computer is required.

Here's a selection of available Datapoint software:

OPERATING SYSTEMS

- DOS** A powerful Disc Operating System based on the 2.4 megabyte cartridge disc.
- MTOS** An operating system based on the Industry-compatible magnetic tape.
- CTOS** For stand-alone operation, a powerful cassette-tape operating system.

DATABUS, A HI-LEVEL LANGUAGE — Databus, the Cobol-like Datapoint Business Language, was written especially for the Datapoint. The language contains comprehensive character and arithmetic capabilities. While programs may be written quickly in English-language statements, its real power lies in its ease of I/O operation. Tapes, disc, and printers are handled in Databus as well as communications peripherals.

SCRIBE, A TEXT PROCESSING LANGUAGE — The combination of a Datapoint 2200 plus an upper and lower case printer can form the heart of a text-processing system. The SCRIBE program, actually a high-level language, allows text to be entered via the 2200's keyboard, visually edited and stored on a cassette tape. Upon command, this stored text may then be printed on a Selectric typewriter or on any Datapoint printer. Users having heavy text handling

chores such as reports or manuals will find the SCRIBE system extremely cost/effective.

ASSEMBLY LANGUAGE PROGRAM GENERATION

Machine Language Programs are quickly constructed by use of the Editor, Assembler, and a selection of Debuggers.

TERMINAL EMULATORS

Datapoints can simulate many well-known terminals and offer a multi-purpose alternative to a user. A variety of Terminal Emulator programs are available with many of the packages offering more flexibility than the original, yet maintaining the required discipline. Recent terminal packages include an IBM 2780, CDC 200 User Terminal, UNIVAC DCT-2000 and UNITERM, a flexible teletype-format emulator.

UTILITIES

Many sub-routines and other useful software items are available for the applications programmer. I/O drivers, communications, fixed and floating point arithmetic and a variety of other routines are available as well as a complete set of diagnostics.

This proven-in-use software capability is a big reason for the success of the Datapoint 2200 as a versatile computer or data terminal system in more than 1000 installations. Prices for the Datapoint 2200 begin at \$6040 with a variety of lease and purchase plans, with worldwide maintenance available.

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Bits & Pieces

Non-IBM Block Multiplexer Channel for 360, 370 Users

SAN FRANCISCO — IBM users are offered a new source for channels with block multiplexer capabilities.

The channel is built by Itel and offered to 360 and 370 users as a direct replacement for the IBM 2880 which allows attaching rotational positioning devices, such as 3330-type disk subsystems.

Cost of the new unit is promised at least 10% under IBM's price of \$3,240/mo (\$152,280 buy) for Model 1 2880.

The firm is located at one Embarcadero Center.

IBM Disks for Your PDP-15

IRVINE, Calif. — PDP 15 users can interface their minicomputer systems to IBM 2311 or 2314 compatible disk drives with a DC-18 Disk Controller, according to Telefile Computer Products.

Up to eight disk drives can be controlled through the PDP 15's single cycle I/O channel.

Delivery requires about 60 days. Prices start at \$15,000 from 17785 Sky Park Circle, 92664.

Protection Problems for Power

WILLOUGHBY, Ohio — Protection of uninterruptible power loads and other connected circuitry is provided by a Parallel Redundant Uninterruptible Power System (UPS) available from Cyberex, Inc., according to the firm.

The 7-1/2 kVA unit sells for \$18,000 with other units with different specifications also available from 4399 Industrial Pkwy., 44094.

Entrex Adds Key-to-Disk

BURLINGTON, Mass. — Entrex System 480 users can add a key-to-disk remote capability with an Entrex Data/Scope.

Remote sites can consist of one or more keystations with one line required for each. Operation is at 1,200 bit/sec on the switched network.

One year lease for the Data/Scope is \$94/mo with an additional \$40/mo for the adaptor and modem from 168 Middlesex Tnpk., 01803.

Mark Sense Reads Both Sides

MINNEAPOLIS, Minn. — National Computer Systems' Sentry 7010 Optical Mark Reader claims the ability to process twice the amount of information by reading both sides of a document on one pass.

Documents ranging in size from 3 by 7 in. to 8-1/2 by 11 in. can be read by the 7010 at a rate of 3,000/hr., according to the firm.

Rental for the 7010 system starts at \$1,200/mo. on a five year contract from 4401 W. 76th St., 55435.

Cartridge Drive Added to Mini

FAIRFIELD, N.J. — Digital Computer Control D-116 minicomputer users can add a cartridge disk drive to obtain up to 3.2M bits of on-line storage, according to the firm.

The moving head drive is available with recording densities of 1,100 or 2,200 bit/in. and provides for single or double density recording.

Prices begin at \$5,000 from 12 Industrial Park, 07006.

Service Center for Computers

WALNUT CREEK, Calif. — Datacraft Corp. — manufacturers of general-purpose computers — has established a District Service Center here to serve West Coast and mountain states.

Correction

CPUs are only available from IBM on a full-rate rental basis. IBM does not rent CPUs on fixed-term leases as reported in the Nov. 15 issue.

Afraid of Consequences

Users Reluctant to Move Away From IBM

By Michael Weinstein
Of the CW Staff

A recent sample survey shows that many users run 100% IBM hardware because:

1) IBM uses management's fear and misunderstanding of computers to present themselves in the image of conservative and thoughtful businessmen

2) Many DP managers opt for the safety of choosing IBM even though they feel that mixing their systems with other equipment could save money because they do not want to take the personal risk of being wrong, and

3) DP managers fear that if they do go outside IBM they will not get good service and if there are failures IBM will use its leverage to imply it is the DP manager's fault.

Given these reasons many DP managers have "copped out" and instead of trying to reduce costs they do pretty much what the IBM salesman says.

Some users openly state that while IBM gives superior service and keeps close contact with the DP manager, the salesman's real interest is with the person who pays for the equipment and in many cases this is not the DP manager.

In many cases the lack of expertise to investigate other options and the unwillingness to take the risk is demonstrated in that most users surveyed paid voice tribute to the concept of mixing equipment for the best performance cost ratio but left the practice to someone else.

One user — more candid than most — stated he would like to investigate other sources for peripheral equipment or try using add-on memory to save his firm money, but he did not personally want to take the chance of being responsible for his system's failing.

Stating that he did not want to be quoted by name he said:

"If I were to use non-IBM equipment and it were to fail with no maintenance near, the blame would fall on me. Right now the management of this firm trusts IBM."

"The equipment they supply is functionally good and the service is always there. So why should I take the chance?"

"If I did change, IBM might say that faults were caused by using other equipment and this would further hurt my position. I am sorry to admit it, but frankly we have just 'copped out.'"

The reliance of management on IBM was explained by a consultant for a large East Coast bank who believes that in many firms the data processing department has had its decision power over the purchase of equipment deteriorate to the point where now they merely act as advisors.

This distrust of DP personnel has grown because DP departments made too many initial mistakes in cost projections years ago and were disposed to giving long technical explanations to support their position, he continued.

On the other hand, IBM is very careful to curry the management's confidence. He pointed to IBM's television commercials that are directed at top management and promise "Not just Data, Reality." IBM has spoken to the businessman about business and some firms have come to trust their IBM salesman more than the DP department.

This is understandable, he said, because most DP operations do not have the internal expertise to evaluate options. Management pays for the computers and IBM keeps management happy.

A DP manager in the Mid-West confirmed this view when he pointed out that all his

equipment was bought on the East Coast by the home office, and he just operated what he had.

Operationally he had no problems, maintenance was good, and all the East Coast wanted to know was if he completed his tasks on time.

When asked if he ever considered recommending outside equipment to be used with the IBM CPU he felt it was not his responsibility. But as an after-thought he hastened to add that he kept abreast of the industry and the independent vendors had come a long way and could save many users a great deal of money.

Large corporations surveyed were as loath to mix equipment as small users even though they had more internal expertise, more equipment, and a greater chance of reducing costs.

One of the big three auto makers has a division DP manager who runs an installation of multiple IBM 370 computers and maintains total IBM integrity of his system because "we are worried about the inter-relationship problem of one guy pointing to the other as the cause of any failure."

When asked if he agreed or disagreed that users could save money and possibly provide better service by investigating non-IBM sources for equipment, he felt that mixing equipment was not proven reliable and there was "more to cost than the initial payment for the equipment." He expounded this by citing increased costs for controllers and interfaces for new equipment.

The survey found users removed from metropolitan areas were more prone to remain loyal to IBM. The reason given most often was the fear of not being able to receive support from the other company.

A rural southern telephone company explained that IBM is just 12 miles down the road while the next nearest support for any type of other equipment is over 100 miles away. "When we have a problem, we want it fixed and IBM is right there," the DP manager concluded.

A firm in Massachusetts told of trying to decide between using add-on core memory to exceed the limits IBM suggested or upgrading to a larger IBM system.

In the end they upgraded even though they felt the add-on was operationally equivalent and less costly because they were frightened that IBM would not support their system as they had in the past.

When it was pointed out that IBM had made consent agreements to support certified compatible memory they stated they knew this, but "Who really knew if they would?" The DP manager concluded that if "you stay with IBM they treat you real nice, but if you start to leave, well you know."

Printer Designed for the User Wanting to Intermix Type Sizes

NASHUA, N.H. — Dataroyal has a printer system that allows users to vary the size of printed letters and numbers from 1/10-in. high to 2-in. high.

The advantage of the printer, according to the firm, is that users can highlight certain information.

Shipping Labels are Typical

Typical users might be a shipping firm which needs to print labels with a long range visibility or an insurance company which wants certain information on standard forms emphasized.

Standard copy can be printed at the standard size of 1/10 in. and special information intermixed in a higher and bolder format, a spokesman stated.

Functionally, the printer uses a standard 132-character line divided into 1/10-in.-sq. sections. For standard output the printer acts as a normal 132-character line unit with one letter or character filling each section.

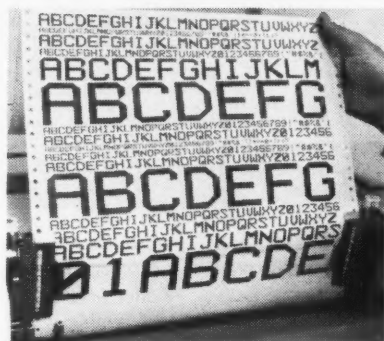
Printer Incorporates Mini

To print characters larger than the standard, an expansion algorithm is used. For example, to print a letter 1-in. high the printer makes 10 horizontal passes, blacking in appropriate areas to finally form the specified letter.

The expansion routine and other software capabilities are furnished by a minicomputer in the printer system.

The minicomputer comes with all necessary software and interfaces so users can attach the system to almost any standard computer system, the firm stated.

Priced at under \$20,000, first deliveries



Printer allows users to vary type size.

are expected in June 1973 from Dunstable Road, 03060.

GSA Offers Data Handbook

WASHINGTON, D.C. — A management handbook covering information retrieval is available from the General Services Administration (GSA).

The GSA handbook — entitled "Information Retrieval" — covers the application of modern information methods and equipment to improve the dissemination, storage, and retrieval of information.

It outlines methods of conducting information retrieval surveys, how to design a coordinated index system, and how to select the system and equipment to meet users requirements. Step-by-step procedures are presented for the manager to follow in determining solutions to his data retrieval problems.

Included are forms and charts that will

help the user determine his specific needs and weaknesses. The appendix includes a list of equipment and supply sources.

The new publication is the third in the managing information retrieval series. The first two handbooks were "Information Retrieval Systems" and "Microfilm Retrieval Equipment Guide" — both published in 1971.

Sold by Government

The general public can purchase copies of the new handbook from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, for \$1.25 each.

The GPO Catalog Number is GS4.6:In3/2.

Wall St. Bullish On Computer-Output-Microfilm

By Michael Weinstein
Of the CW Staff

NEW YORK — In the mid-1960s Computer-Output-Microfilm (COM) made its debut on Wall St. Little was understood of the technology, but the speeds were impressive, the end product was satisfactory, and it was hoped that COM could replace impact printers for high volume work.

Seven years later, COM is threatening to replace everything but the CPU, with impact printers the most endangered species on the Street.

Microfilm first replaced printers for the production of large volume reports, according to John McCarthy of White, Weld and Co.

Merrill-Lynch produces more than 20 million pages of printed material a year from microfilm, McCarthy stated.

The technique used is to display information onto display terminals from magnetic tape. As each image is displayed it is photographed with the advantage to the user that a sequence of images can be

photographed 30 times faster than the same information could be printed on impact printers, said Jim Hurly of Eastman Kodak.

From the microfilm reels books are printed for daily stock transactions showing which customer bought which stock, where the stock actually is located, etc.

McCarthy states this practice has become common on the Street with his own company printing about 250,000 pages from microfilm. The major advantage other than speed is that printing off-line leaves the computer free to perform other tasks.

Microfilm Becoming Dynamic Media

Microfilm is making other inroads into standard computer usage — most evident in information retrieval. Using an Optical Character Recognition (OCR) reader to scan reels of film Wall St. users are creating data base access systems that can be run off-line and even threaten the continued use of large disk-subsystems and tape libraries.

A typical application is to use the terminal to query the computer as to what reel and what image contains specified information.

Once the location of the microfilm image is found the user merely loads the specified reel and locates the correct image.

Users have found this requires far less disk space than keeping the entire record on-line.

Another application takes the entire process completely off-line by adding BCD information as each image is photographed from the display terminal.

With microfilm created in this manner, the user can use an OCR reader to scan reels of film to find specified images.

Some manufacturers are planning to improve on this technique by making a terminal display/microfilm-photography hybrid that will allow the user to edit his film from the terminal.

Another concept under study will incorporate a light pen feature to allow users to write directly onto the micro-

film — adding special information or changing existing information.

Some units are available that allow hard copy to be produced right from the display screen by pushing a button, according to Hurly.

There is no foreseeable limit to these capabilities, he states. An exciting possibility is to have software features that will allow the user to sort and merge from microfilm to produce specialized reports.

Wall St. is one of the first to use this technology, Hurly continued, because they have standard formats for their information from firm to firm and they got in early because they needed to produce mass volumes of printed material and looked for a method superior to impact printing.

Will this process become available to the general user? One observer stated "probably not" because IBM will not give its blessing before seeing if COM technology will impact the printer, tape and disk market.

Two Systems Offered To Medical Users For Heart Treatment

DEC and Hewlett-Packard have recently announced separate systems for medical institutions concerned with heart treatment.

The HP system is directed at doctors and hospitals with access to a computer with a Fortran compiler. It can interpret Electrocardiographs produced on magnetic tape by an ECG Data Collection System from the Medical Electronics Division of Hewlett-Packard.

The HP system, Model 1532A, takes patient identification and 3-channel ECG information from patient terminals or previously recorded analog tapes, digitizes the information and records it in IBM 7- or 9-track format for input to almost any business computer, according to the firm.

The system incorporates a built-in minicomputer to confirm connection to the ECG terminal, assure correct identification of each patient with each recording and check data as it is being recorded.

The basic system consists of five data/receiver controllers — one per telephone line, an A/D converter, a minicomputer, digital tape recorder, chassis and teleprinter. ECG terminals are not included.

The system can be expanded by adding more terminals and/or more core memory and disk memory system.

Price for the basic model is \$35,000 from 175 Wyman St., Waltham, Mass., 02154.

DEC System for Cardiologists

DEC's offering is a "turnkey" system that displays results of cardiac catheterization data.

The Cath-1100 system offers three modes of operation:

- Survey mode displays all dynamic information from the three current catheter positions

- Investigative mode is used for special procedures requiring more than minimal interaction — dilutions, pacing, stress test, etc.

- Display mode allows the cardiologist to investigate a large variety of combinations of data in graphic form.

The Cath-1100 system has been designed to require a minimum of physician interaction, a spokesman said. Commands are transmitted directly from a keyboard which can be fitted with sterile draping and mounted near the patient.

Basic configuration consists of a PDP-11/40 with 16K core memory, I/O printer, paper tape system, extended arithmetic element, real-time clock, tape drive, A/D converter and serial interface device.

Delivery starts January. The price is around \$60,000.

POTTER PERIPHERALS HAVE AN ENGINEERING EDGE

2 MILLISECOND WRITE ACCESS TIME

AVERAGE ACCESS 50% FASTER

SINGLE CAPSTAN RETRACTABLE LONG-WEARING HARD COAT HEAD

1500 lpm PRINTING - 12.5% FASTER THAN 1403

INTEGRAL CONTROLLER HANDLES UP TO THREE PRINTERS - SAVES FLOOR SPACE

FAST GENTLE IN TANK REWIND

AT 3420

AVAILABLE FOR ON OR OFF LINE OPERATION

DD4330

LP 3403

When it comes to plugging independent peripherals into your computer be sure you're getting more than just the best price. There are a lot of companies offering plug-compatible tapes, disks and printers at low prices. There's only one company that can deliver peripherals that give performance with an engineering edge — Potter. Every Potter tape, disk or printing system provides you with design innovations that set the state of the art.

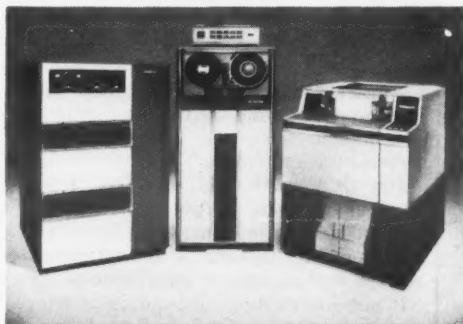
Potter Magnetic Tape Units for example, are all supplied with our patented Hard Coat Read/Write Heads. The long-wearing surface of plasma applied ceramic on our tape heads, virtually eliminates tape unit adjustments associated with head wear. It means you get less machine downtime and higher data reliability. These outstanding heads are on all Potter 3420's and 2420's along with a host of other engineering pluses.

Our DD4330 Disk Storage System is another example of an engineering

edge. The average access time on the Potter unit is 20 milliseconds. That's 50% faster than the 3330! It's faster because Potter engineers did a better design job. Because they did, you benefit.

The performance of the Potter LP 3403 High Speed Chain Printer is further evidence that when you have Potter Peripherals you have an engineering edge. The LP 3403 gives print quality unsurpassed and it prints faster. A minimum of 12½% faster. 1500 lines per minute at its current maximum speed.

That's what we mean when we say Potter Peripherals have an engineering edge. Every device we manufacture and market has design features that are not available from other manufacturers. In addition to better performance, Potter Peripherals are available for purchase or lease at the lowest prices ever. Get the whole story from your local Potter Representative or write to Potter Instrument Company, Inc., 532 Broad Hollow Road, Melville, New York 11746.



POTTER

A lot more than less expensive.

On the Exhibit Floor

Terminals, Communications to Spark FJCC Show

By a CW Staff Writer

ANAHEIM, Calif. — Data entry, remote terminals and other output devices, communications devices, auxiliary storage equipment, and the return of the minimakers promise to spark the major interest on the exhibit floor here at the Fall Joint Computer Conference.

But while there will be an upsurge of end-user products on the floor this year in comparison to the Spring Joint, there will also continue to be heavy emphasis on the OEM side of the computer community, with displays of some fairly sophisticated OEM devices that users will see popping up in their systems in the not too distant future.

The minimakers will be back in full force, even though the large mainframe makers will continue to ignore the show. In fact, this Joint will mark the third in a row notable for the absence of large mainframes on the floor.

The trend of the minimakers to leave the Joints for more vertical shows seems to have reversed itself however, with all of the major companies planning exhibits, including Digital Equipment Corp., Data General, Hewlett-Packard, General Automation, and Computer Automation.

But even though they will be there, few new products will be on display in the mini area with most of the firms content to display announced equipment and to emphasize the strong points of

their various systems.

Probably the hottest area of end user displays will be in the realm of output equipment, with more than a dozen firms ready to exhibit their wares to the end users. The products range from brand spanking new CRT terminals to COM devices and to the more mundane, but still effective, printers.

While several new products will be unveiled in this area, the trend, again, seems to be to exhibit previously announced equipment, in many cases for the first time, and to emphasize user benefits from the various output methods rather than try to dazzle the end user with startling technical innovations that are not available presently.

In the memory and auxiliary storage area, some of the major competitors which decided not to display at the Spring show will be back, most notably Ampex.

A wide range of tape and disk units will be on display, but the most technically advanced will be the exhibit of Ovonic Memories Inc., which will display a disk drive employing "amorphous semiconductor" technology pioneered by the firm.

Once again however, the trend seems to be toward exhibits of standard IBM compatible tape and disk drives designed to show the user what products are available and their advantages over the same devices offered by IBM.

In this area, on a smaller scale, the battle of the cassette makers is assured of continuing at this show as it has in previous joints, with several firms prepared to announce new units in the fight for the

cassette dollars of both end users and OEMs.

Data entry will be a big topic at this year's exhibit, surprisingly for the first time. Most data entry techniques will be well represented, from direct data entry pushed by the terminal makers through key-to-disk devices to new wrinkles on the more prosaic keypunch.

In the past the keypunch people and terminal makers have been well represented at the shows, but this is the first year that there will be a large number of the key-to-disk makers, including the two largest, Computer Machinery Corp. and Inforex.

With the representation of the key-to-disk makers, therefore, this year's exhibit should prove to be a worthwhile educational experience for the user attempting to find optimum solutions to their particular data entry needs.

The increased user interest in data communications will also be represented on the floor, both in the terminal area and on the modem side and in front end processors from the mini companies.

Once again, there will be few new products in this area, but more emphasis on applying known products to changing user needs and desires.

There will be some interesting products on the OEM side of the exhibit floor that the end user may want to take a look at while at the show. There are several reasons for taking such a look: first, in some cases, OEM products can be used by innovative end users because they fit their needs better than the products currently available for them.

Secondly, many of the products shown

on the OEM side will soon show up in end user products, and by understanding the specifications and techniques used in the components, the user can get a feel for how the entire system will perform.

Thirdly, there are some creative inventions that are being marketed primarily to OEMs that should be of interest just because of their newness and uniqueness.

One of the more interesting to be displayed this year will be the Vortex voice synthesizer from the Vocal Interface Division of Federal Screw Works, which synthesizes the human voice electronically.



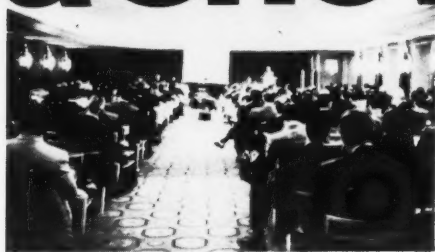
Snapshot Taking — Favorite Pasttime

What to See at FJCC

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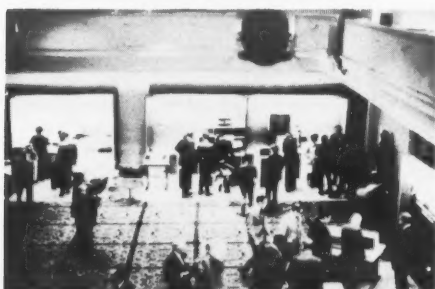
Have we got a show for you!



Plans for The Computer Caravan/73 are now being completed. And it's looking great. We've arranged excellent Forum topics, added afternoon sessions, re-arranged the schedule somewhat to make it more convenient, signed up new exhibitors, and we're pretty enthusiastic about the whole thing. Here are some of the details on The Computer Caravan/73.

Forums

Each day of the three-day show will include Forum sessions on different topics. Experts will conduct panel discussions, followed by shirtsleeve workshops with everyone participating. You'll be able to air your problems, and hear those of



others. And you'll learn how others have solved problems. You'll ask questions and give opinions. The overall subjects include:

- Day 1 — Data Entry
- Day 2 — Data Communications
- Day 3 — Installation Management

Advance enrollment is recommended for the Forums which run from 9 to 2:30 p.m. each day. Fees are \$25 per day, including the Forum lunch and admission to the Exhibit Hall.

Open Sessions

New for this year, we'll be conducting open sessions each afternoon for anyone who wants to attend. Each day at 2:30 a different subject will be opened up for discussion and controversy. Here's the schedule:

- Day 1 — Data Communications Planning
- Day 2 — Software Evaluation Panel
- Day 3 — Small Systems Panel

There is no additional charge for these sessions.

The Computer Caravan/73



COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY



Exhibition

The afternoon and early evening will feature our expanded Exhibit floor. Fifty companies are expected to be there with their latest EDP products and services. And you'll have plenty of time to look at everything that interests you. It's an excellent opportunity to stay ahead of this fast-moving industry. And if you have to make decisions, you should be there.

Schedule

The Computer Caravan/73 will be in 10 cities this year — One of them should be near you. Here's the schedule.

| City | Dates |
|---------------|------------|
| Boston | Feb. 13-15 |
| Washington | Feb. 20-22 |
| New York | Mar. 5-7 |
| Atlanta | Mar. 13-15 |
| Houston | Mar. 20-22 |
| Anaheim | Mar. 27-29 |
| San Francisco | Apr. 3-5 |
| Kansas City | Apr. 11-13 |
| Chicago | Apr. 17-19 |
| Cleveland | Apr. 24-26 |

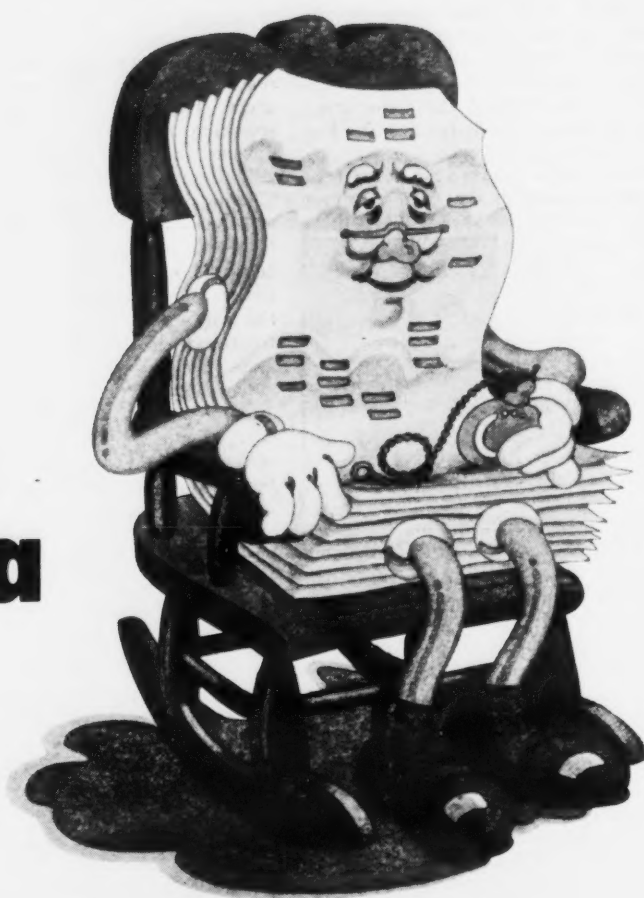
To: Frani Blackler

The Computer Caravan/73
797 Washington Street
Newton, Mass. 02160

I'd like to get all the details about attending the Computer Caravan. Please make sure you send me literature and registration forms in plenty of time for me to enroll for your Forums. I understand that if I wish to attend only the Exhibits and open sessions, no advance registration is required.

Name _____
Title _____
Company _____
Address _____
Zip _____

You're right
Retiring
an old friend
should never be a
hasty decision.



You're used to the punch card and its pokey, unbending ways. People have been adapting data to it longer than you or your computer have been around.

But right there is the real Achilles heel. Everybody's data just isn't the same as two cards in a punch.

We saw that early on, as well as the greater throughput you can get with key-to-tape.

Mohawk Data started with the stand-alone Data Recorder, and we've never stopped teaming it with options.

We pioneered cluster key-to-tape systems.

We went on to key-to-disk with tutorial CRT display in our System 2400.

Point is, today we're the only supplier who has all the options key-to-tape.

We've got choice, not a challenge.

Instead of force-fitting you to a single line of hardware, we've got all the hardware to tailor a system to you. Your documents, your volume, your locations, all the formats you need.

So take the time to hear your options.

After all, you're after the most in throughput with the least in equipment, people and space. We became the Peripheral Power by showing an awful lot of people how.

Call our nearest sales office. Or write for our new brochure that describes a choice, not a challenge.

Mohawk Data Sciences Corp.,
World Headquarters, Utica, N. Y. 13503.

MD

The Peripheral Power



Infoton Display Shown

ANAHEIM, Calif. — A new CRT terminal designed for both buffered (block) or unbuffered (character) data transmission will be introduced and displayed

FJCC
Terminals, Output

by Infoton at booths 3025 and 2524.

The \$2,295 Vistar can be used as a substitute for a teletype-writer in either conversational or message-oriented applications, the firm said.

Each unit contains a 12-in. television monitor to display an

80-character by 24-line screen presentation with character generation accomplished with a 5 by 7 dot matrix. Each unit also incorporates a keyboard, control and refresh electronics, power supply, and both an RS-232C and 20 or 60 mA current loop interface.

With the unit, 11 internally generated, switch-selectable I/O rates and one externally controlled rate are possible. The switch-selectable rates are 75, 110, 150, 300, 600, 1,200, 1,800, 2,400, 4,800, 7,200 and 9,600 bit/sec. The external setting allows a data rate of up to 18 kbit/sec, the firm claimed.



Vistar CRT Display Terminal

The external timing is derived from a TTL-compatible pulse source at 16 times the data rate. The interface also allows for switch-selectable data transmission of 75 or 110 bit/sec and a reception rate at the other selectable speeds.

First deliveries of the unit are scheduled for January 1973, noted the Burlington, Mass., firm.

Graphic Terminal Unveiled

ANAHEIM, Calif. — The display in booths 4 and 5 will feature the Princeton 801 graphic computer terminal and the PEP-402 image storage and scan-conversion terminal from Princeton Electronic Products, headquartered in N. Brunswick, N.J.

The PEP-402, being shown for the first time, costs \$7,200 and uses the firm's Lithocon silicon storage tube which has 3,000 line limiting resolution and 32 different gray levels. The unit includes internal raster generator, synchronization chain, full erase and selective erase features in the basic unit.

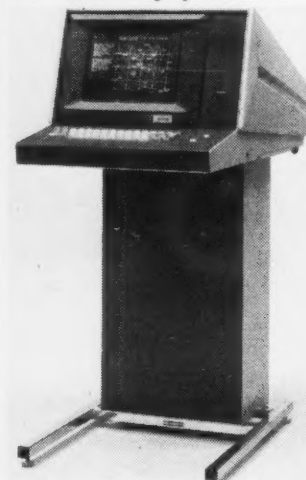
The Princeton 801 unit will be tied into the National CSS network doing electronic circuit design applications. It is a stored image terminal also based on the Lithocon silicon storage tube, which permits displays without flicker, according to the firm.

It also features selective erase and updating of individual vectors, points and characters without the necessity of rewriting the entire image, the firm said.

New Tektronix Units on Stage

ANAHEIM, Calif. — The two newest members of the Tektronix line of display terminals will be exhibited by the firm in booth 3500.

The 4012 terminal offers full upper- and lower-case alphanumeric and graphics capabilities in a unit priced at \$4,950, while the 4013 display terminal is



4012 Display Terminal

specifically designed to take advantage of the various features of APL and costs \$5,450.

Both displays feature TTY-style keyboard with full Ascii capability and are compatible with all accessories of the firm's 4010 display family including a hard-copy unit, tape cassette storage devices and communications interfaces.

The firm's Information Display Products Division can be reached at P.O. Box 500, Beaverton, Ore. 97005.

Printers Focus Of Mohawk Exhibit

ANAHEIM, Calif. — Mohawk Data Systems will have a wide-ranging display in booth 4545 at the Fall Joint with two items in the output category as well as displays in auxiliary storage and data entry areas.

The printer units include the 2441 matrix printer designed for communications, terminal and minicomputer applications, the Model 5321 high-speed buffered drum printer, and the Model 2016 digital lister printer that can operate up to 30 line/sec.

The Herkimer, N.Y.-based firm said its exhibit at the conference features the largest display of Mohawk equipment ever at one show.

Printer Plans Showing

ANAHEIM, Calif. — Anadex Instruments Inc., Van Nuys, Calif., plans to exhibit its DP-750 series of alphanumeric printers at booth 46.

ICC leads the way to 7200 bps data communication with a special offer

If the cost of upgrading to 7200 bps has been holding you back — rejoice. ICC is making it easy to change with a special price offer.

Contact us before January 15, 1973 and you can save up to 30% on ICC Modem 4800/72 data sets.

The cost is actually less than comparable 4800 bps modems!

Why the big deal? Because ICC is out to prove that reliable 7200 bps is here, and with advantages that lower speed modems can't provide.

For details on our special 7200 bps offer, write or send us the form below. We'll rush full information.

ICC

International Communications Corporation

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(Note: Special Offer expires January 15, 1973.)

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Kodak Expected As Main Exhibit Of COM Method

ANAHEIM, Calif. — Kodak will apparently be the major standard bearer for the COM method of output on the exhibit floor at this year's show with displays of both the Kodak Ektalite 140 reader and the Kodak Miracode II system featuring the Model 18 controller and other accessories at booth 4565.

Prepares and Retrieves

The year-old Miracode II system allows both the preparation of microfilm and its retrieval. It can scan 16mm roll microfilm at a speed of 350 document/sec for retrieval and can also produce hard copies of particular documents.

Courier Shows 3270-Like CRT

ANAHEIM, Calif. — Courier Terminal Systems plans to show for the first time a new Executerm 270/275 line of terminals compatible with the IBM 3270 general-purpose CRT displays, the firm said.

In booth 1060, the firm will also display its line of terminals, printers and controllers for users of either stand-alone or clustered displays compatible with the IBM 2260 line of displays.

In addition, the firm will unveil a new communications controller designed to replace the IBM 270X series of equipment.

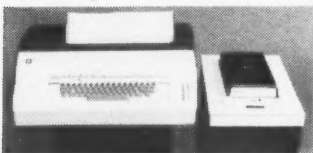
The firm is headquartered at 202 University Dr., Phoenix, Ariz. 85034.

Mag Tape Teletype Planned for Exhibit

ANAHEIM, Calif. — Teletype's exhibit in booth 3081 will emphasize the firm's Teletype 38 wide-platen ASR terminal associated with the 4210 magnetic tape data terminal, the firm said.

The 15-in.-wide pin-feed platen on the unit allows use of standard 14-7/8 in. fan-fold paper and prints 132-character lines at 10 char./in. in upper and lower case.

The 4210 tape unit that will be featured in a terminal configuration along with the Model 38 has



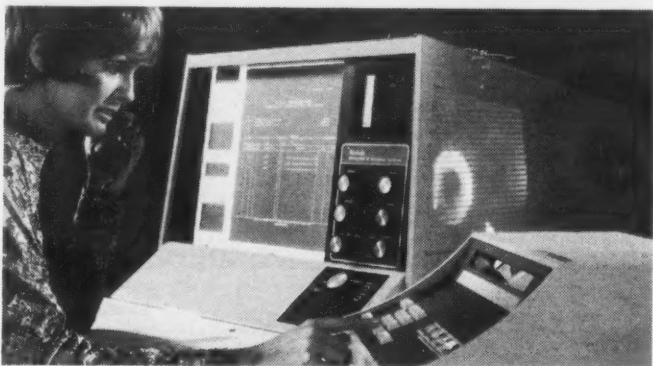
Teletype 38 KSR and 4210 Magnetic Tape Data Terminal

a cartridge with a capacity of 150K characters and can transmit data at rates up to 2,400 bit/sec over voice lines, according to the firm.

The 38 ASR unit costs around \$1,400 and the 4210 magnetic tape data terminal carries a price tag from \$2,200 to \$2,475.

Also on display at the teletype booth will be a Model 38 ASR unit with a punched paper tape system and a low-speed Teletype modem comparable to Bell's 101, 103 and 113 data sets.

The modem is of the automatic answer variety and can be built into the Model 33, 35 and 38 Teletype terminals for an additional charge of around \$200, according to the firm in Skokie, Ill., 60076.



Miracode II System

ments.

The Model 18 controller allows an operator to make several simultaneous searches of microfilm records.

The Ektalite 140 microfiche

reader has a magnification of 40X and costs \$110. It accepts standard 4 in. by 6 in. microfiche jackets containing up to 325 images, the Rochester, N.Y., firm said.

CMC Printer Exhibit Set

ANAHEIM, Calif. — Computer Machinery Corp., which is perhaps best known on the data entry side of the business, may also interest the user seeking solutions to output problems with its exhibits at booth 2055.

The CMC 36 computer-controlled off-line print system uses the IBM 1403 line printer hooked with a mini with up to 65K bytes, a magnetic tape unit, teleprinter and printer controller to interface with the 1403. The system can be expanded to operate with two 1,100 line/min 1403s and four tape units simultaneously, the firm said.

The unit, without the 1403,

rents for \$1,200/mo and a system with two printers and two tape units will cost the user \$1,850/mo.

The unit, also called the Data-print, can accept tapes with any

FJCC
Output, Terminals

blocking factor as well as any block size and can accommodate fixed- or variable-length records, the firm said. It also provides for selective printing with key fields within records and can accept any code and process it internally, CMC added.



THE INCREDIBLE SHRINKING PRICE OF SYS DISPLAYS.



The reputation of the incredible shrinking men from SYS keeps growing by leaps and bounds.

Because while our terminals are known to be among the least expensive you can buy, we have figured out a way to save you even more money.

The incredible shrinking price.

It makes our prices almost as incredible as our terminals. Because it allows you to lower the cost per unit by dividing your capability requirements.

For example, you can buy a two 960-character CRT system for only \$430 more than a single 1920-character CRT system. Instead of paying \$3,430 for a system with one display station, you can pay \$3,860 for a system with two display stations.

In that way, you would get two independent keyboards, two independent TV sets and two times the programmable efficiency for less than \$2,000 per unit.

As you can see from the price chart, buying less can save you more.

Everybody knows that SYS terminals are the most flexible you can buy. And the most intelligent. And the most reliable.

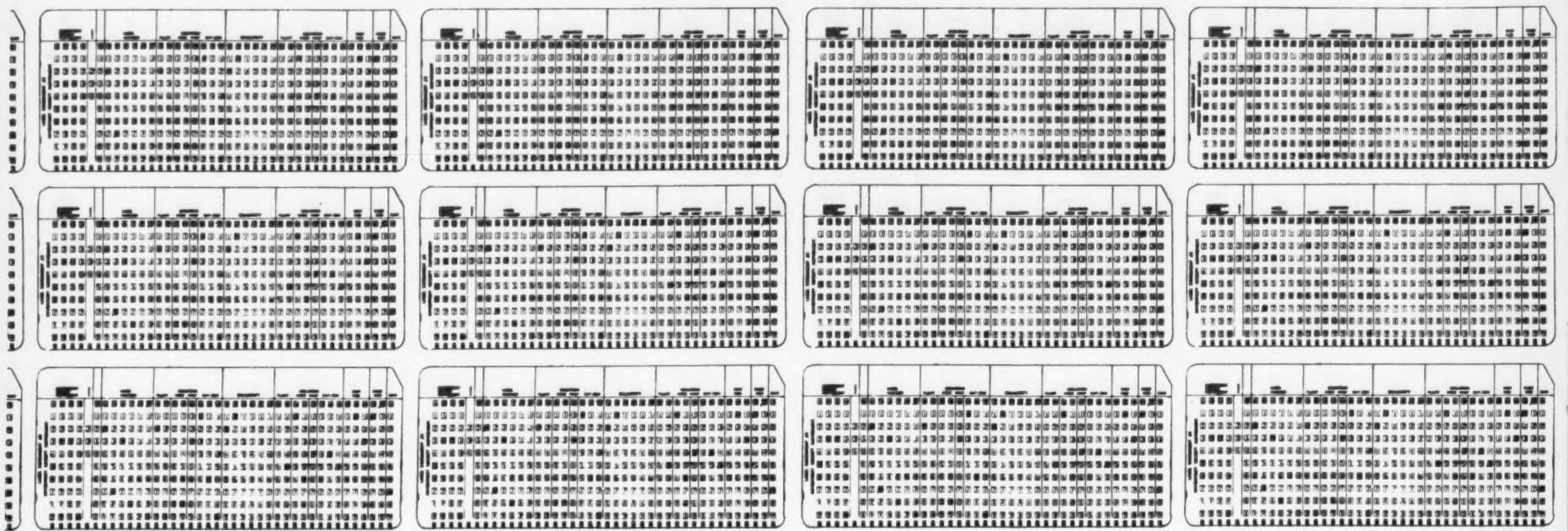
Only now we have applied our shrinking style to the price.

But the best way to see how incredible our prices are is to call Pete Polizzano, VP Marketing, 201-488-0300. Ask him to send you the new SYS brochure and a Terminal Check List.

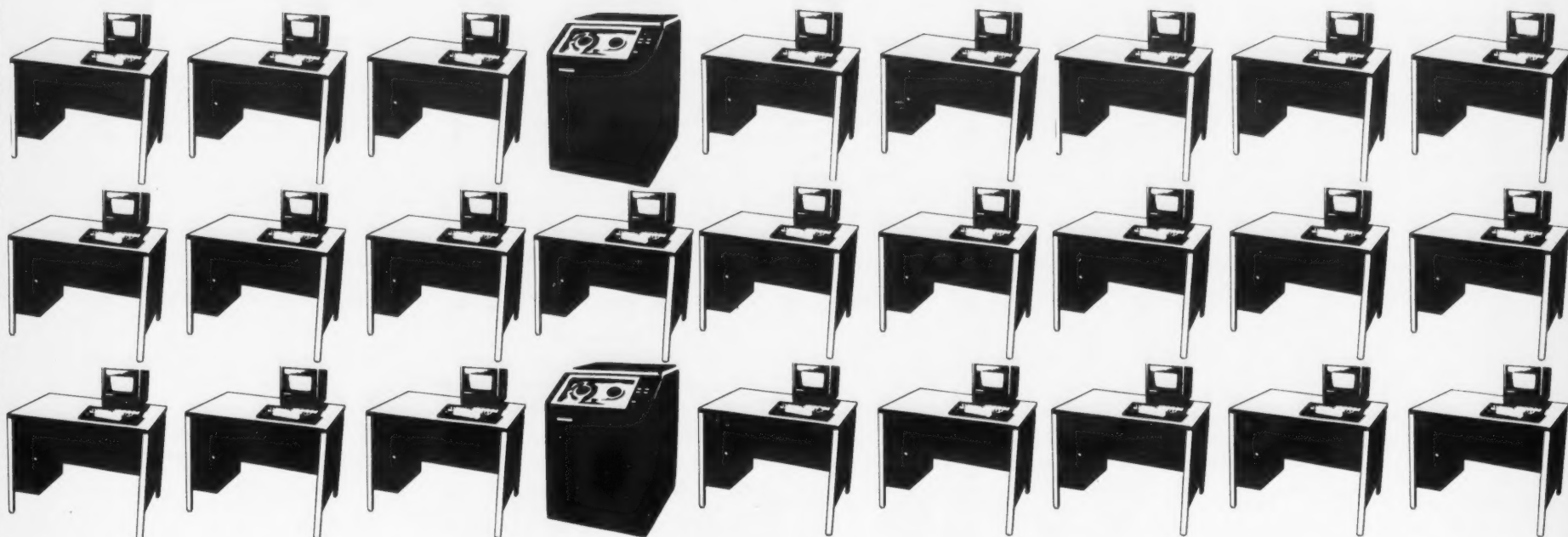
He'll also tell you about the many SYS systems he's shipping all over the world. That Pete is no shrinking violet.

| BASIC COMPONENTS | NUMBER OF DISPLAYS AND CHARACTERS DISPLAYED ON EACH | | | |
|---|---|---------|---------|---------|
| | 1x1920 | 2x960 | 3x480 | 4x480 |
| Type A controller with customer specified features from terminal specifying aid, power supply, and memory for 1920-characters | \$2,995 | \$2,995 | \$2,995 | \$2,995 |
| 12" TV and Keyboard | 435 | 870 | 1,305 | 1,740 |
| Total System Price* | 3,430 | 3,860 | 4,300 | 4,730 |
| Cost Per Display Station | 3,430 | 1,930 | 1,433 | 1,132 |
| | 2x1920 | 3x960 | 4x960 | 5x480 |
| Type B controller with customer specified features from terminal specifying aid, power supply, and memory for 3840 characters | \$3,995 | \$3,995 | \$3,995 | \$3,995 |
| 12" TV and Keyboard | 870 | 1,305 | 1,740 | 2,175 |
| Total System Price* | 4,865 | 5,300 | 5,735 | 6,170 |
| Cost Per Display Station | 2,432 | 1,733 | 1,433 | 1,230 |

*CABLES AND OTHER ACCESSORIES ARE EXTRA



**Think of
The Computer Maker.**
**What's he really done
to improve your data entry?**



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When you think of data preparation, think Inforex. The leading specialist in the new and different world of data entry. Contact your Inforex representative. We have offices in major cities throughout the United States, Canada, and Europe. Inforex, Inc., 21 North Avenue, Burlington, Massachusetts 01803.

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01 Mining/Construction/ Oil & Refining
 02 Manufacturing — Computer or data system hardware/peripherals/other associated mechanical devices
 03 Manufacturing (other)
 04 Utilities/Comm. Sys./Transportation
 05 Wholesale/Retail
 06 Finance/Insurance/Real Estate
 07 DP Serv. Bureau/Software/Planning
 08 Business Services (except DP)
 09 Education/Medical/Legal
 10 Federal, State and Local Government
 12 Communications/Printing/Publishing
 13 Other: _____

YOUR FUNCTION

01 Corporate Officer
 02 Data Processing & Operational Management
 03 Data Processing Professional Staff
 04 Consultant
 05 Lawyer/Accountant
 06 Engineering-Management/Scientific/R&D
 07 Sales/Marketing/Account Executive
 08 Librarian/Educator/Student
 09 Other: _____



COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Centronics to Spotlight Displays, Printers

ANAHEIM, Calif. — The Centronics display at the FJCC will spotlight two output methods — printers and displays — in booth 2065.

The Model 101 printer uses a 5 by 7 dot matrix pattern to print at 165 char./sec and from 60 to 200 line/min. The unit features the 64 Ascii character set.

The unit's big brother, the Model 101A, uses a 9 by 7 character matrix and features paper runaway control, remote select/de-select capability as well as 101 features. Options include line drivers, optional character sets and an elapsed time indicator.

The Model 102A also uses a 9 by 7 dot matrix, but can print at 125 line/min for 132-character

lines through the use of two printing heads which operate together and print in both direc-



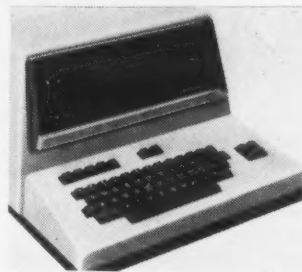
tions. Features include hardware code selector, 64-character repertoire, and transmission up to 75 char./sec in the parallel mode. Interfaces for most minis are available.

The display unit, the Model 401, features a 132-character display consisting of four lines of 33 characters each. A 5 by 7

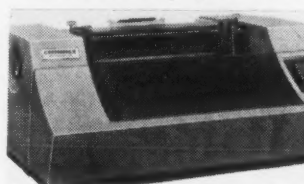
dot matrix forms the 63-character Ascii code. Priced at \$1,495 the unit contains a buffer memory, and while designed as an input device for the Centronics printers, the unit can find applications as a stand-alone device.

The firm also plans to display a Model 306, an 80-column matrix printer which operates at 100 char./sec and costs half the price of the Model 101.

For the first time the firm will be showing and introducing a prototype of both graphics and high-speed printers that will be available in the first part of 1973 from One Wall St., Hudson, N.H. 03051.



Model 401 Display Terminal



Model 101A Matrix Printer

Vector General Brings Terminal

ANAHEIM, Calif. — Vector General will bring its new Vectorgraphics 11 terminal from its Canoga Park, Calif., headquarters to FJCC booths 4572, 4574.

The unit, designed specifically for such applications as simulation and modeling, permits the operator to either draw or modify images on the CRT screen, which automatically enters the data into the memory of the display for computer processing.

The results from the additions or corrections are then automatically displayed for the operator, the firm said from 8399 Toppanga Canyon Blvd.

Printec 100 Set For First Exhibit

ANAHEIM, Calif. — The FJCC booths 1501 and 1503 will be the setting for the first public showing of the new Printec 100A full-character serial impact printer, which uses a 96-character font and operates at 70 char./sec.

The unit complements Printer Technology's earlier PT-100 which has upper-case capability only.

Priced at \$2,600, the unit prints at a rate equivalent to 26 line/min for a full 132 col/line. It includes a 2-channel VFU and 8-bit Ascii interface within the base price.

Options include buffers, modems different type fonts, 8-channel Vertical Format Unit and different interfaces, the firm in Woburn, Mass., said.

Data Disc Adds Color to Display

ANAHEIM, Calif. — One entry that sounds out of place in the terminal area is Data Disc Inc., which will be displaying its Anagraph multichannel graphic display system in booths 4550, 4552 and 4554.

While the Anagraph is not a new product in itself, the firm will be introducing color capability for the first time during the show by demonstrating a system that can generate up to 28 different hues on a color CRT.

Basically the Anagraph system, designed for IBM 360 and 370 users, features both alphanumeric and graphics capabilities. A minicomputer within the system permits the Anagraph terminals to emulate the IBM 2260 performance with no program modification at the host CPU.

Because of this feature, the firm claims the Anagraph is suited to IBM 2260 users ready to go beyond alphanumeric and into the world of graphics.

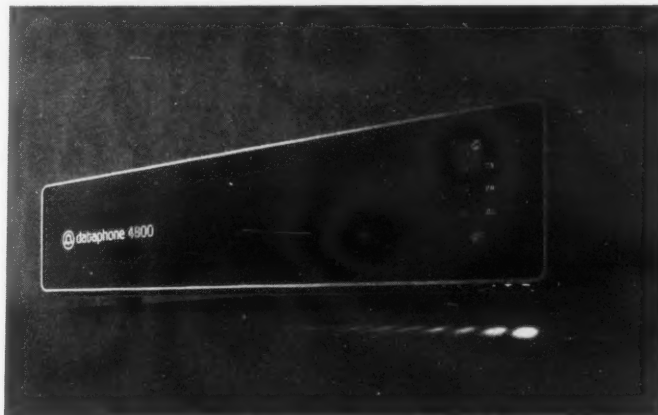
Data Disc is at 686 W. Maude Ave., Sunnyvale, Calif. 94086.

'Carry On' Terminals Made for Suitcase

ANAHEIM, Calif. — Computer Devices, Inc., Burlington, Mass., will exhibit its line of portable "carry on" terminals which offer speeds up to 30 char./sec. The units weigh 22 lb and fit into a small suitcase suitable for carrying on airlines.

The firm also plans to announce new products at booth 1004.

Introducing the 4800, first in a new family of data sets from the Bell System.



The Bell System's new solid state 4800 data set is designed for transmission at 4800 b.p.s. — and it's economical.

This set cuts transmission costs three ways. First, the charge for the set itself is low.

Second, an automatic equalization feature makes it possible to transmit at 4800 b.p.s. over basic, unconditioned, private-line facilities.

Third, it features rapid startup and turn around — ideal for polling applications.

This new, compact data set also offers the convenience of local and remote loop-back testing as well as status indicating lamps.

For details on the new data set, including its low price, call your local Bell System Data Communications Consultant, or mail our coupon.

AT&T and your local Bell Company.

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Dear Sirs: I am interested in "dataphone 4800."

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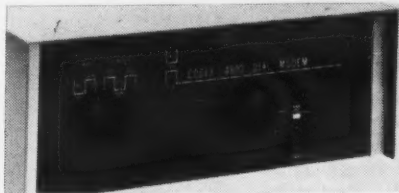
City _____ State _____ Zip _____



4,800 Bit/Sec Modem Exhibited By Codex Corp.

ANAHEIM, Calif. — Booth 2080 will showcase the Codex 4800 dial modem, a 4,800 bit/sec modem for operation over the ordinary switched telephone network.

In the simplex version the unit provides transmit or receive-only 4,800 bit/sec service. Equipped with its Reverse Channel Option the unit can furnish full-duplex



4800 Dial Modem

izer and uses the Quadrature Amplitude Modulation technique.

The firm is based at 15 Riverdale Ave., Newton, Mass. 02195.

FJCC

Communications

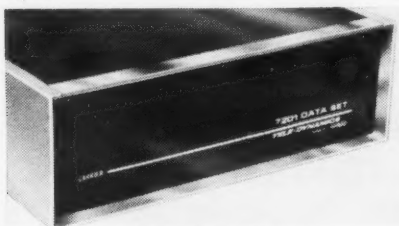
asymmetrical operation with only a single telephone connection.

In the half-duplex configuration the modem executes a 40-msec turnaround time, according to the company. The system features an automatic and adaptive equal-

Bell-Compatible

Data Sets Ready

ANAHEIM, Calif. — Tele-Dynamics division of Ambac Industries will exhibit its line of Bell-compatible data sets in booths 3059 and 3061, including the 7113 A/B, 7103F, 7103G, 7202 D/E and the 7201 A/B.



7201 Data Set

In addition, the firm will be introducing a new 4,800 bit/sec data set, the Model 7208A, which is compatible with the Bell 208A, the firm said from headquarters at 525 Virginia Drive, Fort Washington, Pa. 19034.

Milgo Modems Out

ANAHEIM, Calif. — ICC/Milgo, Melbourne, Fla., will unveil its Modem 24, the first of Milgo's most advanced series of modems incorporating MOS/LSI technology, and its full line of high-speed modems, in booths 2041-2047 and 1540-1546.

The new modems offer a remote test feature for error diagnosis in point-to-point or multipoint systems from a single site; a status panel display for on-line evaluation of the data communications system; and Fastar, which reduces personnel time and toll charges by minimizing turnaround delay on dial circuits, the firm said.

A self-test capability is built into the modem. Other options include automatic answer and reverse or secondary channel.

The high-speed modem line operates at speeds from 2,000 bit/sec to 9,600 bit/sec.

Timeplex Demonstrates Multiplexers, Linebacker

ANAHEIM, Calif. — Timeplex Inc. will demonstrate multiplexers which could reduce data communications and initial front-end cost.

The firm will also show its Automatic Linebacker for restoring vital communications links in the event of failures in the transmission line at booths 2503 and 2504.

The firm is at 65 Oak St., Norwood, N.J.

Paper Samples Available

ANAHEIM, Calif. — Free samples of Computer Copies Corp.'s Self Copy carbonless paper will be given out at booth 3065-3069. The paper can produce 10 sharp copies on high speed printers, the New York City firm said.

Teleprocessing Announces ACAU

ANAHEIM, Calif. — Five to 20 communications lines can be operated unattended by an Automatic Calling and Answering Unit (ACAU) to be displayed in booths 6 and 7 by Teleprocessing Industries Inc.

Shown for the first time, the unit is designed as an alternative to dedicated communications networks by allowing computer system to make calls and answer calls automatically over the Bell di-

rect dial net, the Western Union TWX network and DAA-connected terminals.

The Model 1200 ACAU is modularly constructed in units of five, 10, 15 or 20 lines in interfaces with minicomputers in accordance with EIA RS-366 standards and is compatible with Bell 202C modems. Normal speed is up to 1,200 bit/sec.

The Model 300 ACAU is compatible with Bell 101, 103 or 113 series modems, according to the firm from 82 McKee Drive, Mahwah, N.J. 07430.

ADS Commo Line Due

ANAHEIM, Calif. — A complete line of communications equipment including multiplexers, modems, communications processors and system equipment will be demonstrated by American Data Systems at booth 4515.

New products include a version of the MOS Digital Data Modem, and a reduced price version of the ADS-670 Data Distribution System.

ADS is at 8851 Mason Ave., Canoga Park, Calif., 91306.

Paradyne Pix Product Planned

ANAHEIM, Calif. — A Pix system "designed to replace conventional teleprocessing hardware and software" will be demonstrated by Paradyne Corp. in booth 4555.

The systems, which are being announced at the show, will be used with an IBM 1403 line printer and 2501 card reader on the floor communicating with an IBM 360/40 in Tampa, Fla. The demonstration will include the submission

of Cobol jobs through the card reader, processing on the 40, and printing of the output on the line printer.

The firm will also show the Bisync-48, a 4,800 bit/sec modem for dial-up lines using IBM Bisync protocol and the 810 Bisync Analyzer which allows rapid isolation of problems in Bisync communications links by on-line display of line control dialog, according to the firm at 8550 Ulmerton Road, Largo, Fla. 33540.

silent 700
electronic data terminals

Texas Instruments announces...



Tapes, Disks, Memories Will Be Well Represented

High Density Disk System Made Using New Technique

ANAHEIM, Calif. — The technological "wonder" of the Joint Computer Conference is likely to be found in booth 2519 where Ovonic Memories Inc. will be displaying its OMI Series 6000 disk memory systems that use "amorphous semiconductor" technology developed by the firm.

The new technological innovation is said to allow the storage equivalent of a 2314 disk pack to be crammed into a single disk cartridge — an improvement level in storage capacity that the firm claimed was a factor of 10 over other storage methods. The firm is at 5261 W. Imperial Hwy., Los Angeles, 90045.

Potter Plans Tape Drive, Floppy Disk Demonstrations

ANAHEIM, Calif. — Potter Instruments, Melville, N.Y., will be exhibiting several new additions to its line of tape and disk

drives and printers at booth 4031-4037. The 181052, the newest member of the automatic threading tape transport line, operates at 75 in./sec.

The SC1051 single capstan tape transport, with bidirectional tape speeds to 75 in./sec, will also be demonstrated. All transports are available for 7- or 9-channel NRZI recording to 800 bit/in. or for 9-channel 1600 bit/in. PE operation.

The DD480 "floppy disk" drive will be shown for the first time. The unit's transfer rate is 33.3 kbit/sec and is designed to replace serial tape cassettes.

Ampex Brings All Three: Tapes, Disks and Memory

ANAHEIM, Calif. — Ampex will be coming back into the joint conferences with a relatively large display of auxiliary storage devices in addition to its mainframe memory for the 360 line.

The firm plans to exhibit its Mainframe ECM, a one million byte replacement for

the IBM 2365 storage used with IBM 360/65, 67 and 75 computers.

In the disk area the firm plans its first public demonstration of the DS-330, the Ampex entry into the IBM 3330-compatible memory race. Ampex will show the Quad TM-34 tape drive which is equivalent to four IBM 3420 units packaged into the space of two.

The ARM-3360 unit, a replacement for mainframe memory on IBM 370/155 and 165 computer systems will also be on show at booth 1056.

The firm is located at 13031 W. Jefferson Blvd., Marina Del Rey, Calif. 90291.

Caelus Introduces Tapes

ANAHEIM, Calif. — Caelus Memories, in booths 4524-4528, will introduce three complete lines of tape drives, 7 in., 8-1/2 in. and 10-1/2 in. The units are available in both NRZI and phase-encoded configurations.

Caelus will also unveil a 200 track/in., 6M byte/disk cartridge disk drive for minicomputer users which features an

optional fixed disk.

Other members of Caelus' line of disk and tape drives for minicomputers will be on display along with disk packs and cartridges.

FJCC

Memory Products

The firm is at 967 Mabury Road, San Jose, Calif. 95133.

Com-Mark 3330 Unit Shown

ANAHEIM, Calif. — Com-Mark Inc. will unveil its IBM 3330-line disk drive at booth 1007, in addition to displaying 2314-compatible units and double density drive.

The CM230 is the 3330-compatible unit which uses a 120-high removable disk pack, with the CM 214 for 2314 users. The CM215 is the firm's offering in the double density area.

The firm also plans to announce a CM340 tape unit which is designed to be a replacement for the IBM 3420 tape drive. Com-Mark said from 1500 Adams Ave., Costa Mesa, Calif. 92626.

Sykes Sets Cassette System

ANAHEIM, Calif. — Sykes Datatronics, Rochester, N.Y., will introduce a new version of its Model 2220 cassette system in booths 3054, 3055 and 3056.

In addition, the firm plans to announce a new "high performance" minicomputer cassette system with a PDP-11 interface and new ECMA/Ansi compatible transports.

Techtran Has Dual Cassette

ANAHEIM, Calif. — A new dual cassette version of Techtran Industries 4100 family of cassette systems will highlight that firm's exhibit in booth 3030.

The model 4200 provides up to 2,400 bit/sec full duplex operation, on-line and off-line to both computer systems and remote devices, the firm said from 580 Jefferson Rd., Rochester, N.Y. 14623.

Fabritek Parades Memories

ANAHEIM, Calif. — Fabritek will be showing its main memory boxes for IBM 360 computers in booth 1014.

Highlighted in the exhibit will be the Mod 65, which is designed as a replacement for the memory of a 360/65 and the Mod 30 which replaces memory in the 360/30, the Minneapolis-based firm said.

New Tape Reader Set

ANAHEIM, Calif. — On the paper tape side of computer input equipment, Add-master Corp. will introduce a 120 char./sec paper tape reader in booth 4536.

The stand-alone reader is fully equipped with power supply and RS-232 output interfacing. The firm is at 416 Junipero Serra Drive, San Gabriel, Calif.

the twin-cassette "Silent 700" ASR terminal for \$2,750

(KSR terminal for \$1500)

Here is a powerful improvement over conventional paper-tape ASR (automatic send-receive) teletypewriters ... at half the cost of other equipment with comparable performance.

In *Silent 700*® ASR terminals, TI has combined sophisticated magnetic tape cassette data storage with the field-proven features of *Silent 700* keyboard data terminals.

Speed. Quietness. Reliability

Data transmission rates up to 120 characters-per-second can significantly reduce line charges. And quiet, 30 characters-per-second electronic printing makes the *Silent 700* acceptable to any office environment. Field operating experience has proven that *Silent 700* terminals typically require only one or two remedial service calls per year.

Communications Economy

Off-line data preparation and transmission from cassette storage reduces errors, line costs and operator time. Simultaneous transmit/receive and simultaneous on-line/off-line operation permit maximum system utilization.

Powerful Data Editing

Data is recorded in ANSI standard block format. Block or character data editing capability is combined with high-speed tape duplicating and an optional automatic record locator for fast search of cassette files.

Reliable Data Storage

Philips-type digital-grade cassettes store 800 bits-per-inch for up to 310,000 characters storage per two-track cassette. Bit-error rates are typically no more than one in 10⁷.

Modular Expandability

Simplified design permits easy addition of other optional features including automatic remote control of record-playback functions, answer-back memory, and built-in modems. The compact \$1500 KSR (keyboard send-receive) model is easily converted to the standard \$2750 ASR model by addition of the cassette module.

OEM and quantity discounts are available. Contact the nearest TI office listed below for more information on how *Silent 700* terminals can cost-effectively improve your data communications system performance. Or contact Texas Instruments Incorporated, Digital Systems Division, P.O. Box 1444, Houston, Texas 77001, phone (713) 494-5115, ext. 2126.



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*Trademark of Texas Instruments Incorporated

TEXAS INSTRUMENTS

INCORPORATED

See the new "Silent 700" ASR terminals at the FJCC, Booth 2500.



"We Have to Remember to Look at a Few of the Exhibits Before We Go, In Case of a Quiz Session When We Get Back."

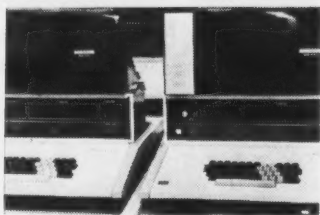
Pertec's DT1000 RJE Terminals Make Debut

ANAHEIM, Calif. — The DT1000 series of terminals for remote job entry and remote batch applications, as well as data entry and media conver-

FJCC
Data Entry

sion, will be exhibited for the first time at Pertec Corp.'s booth 2025.

The basic version of the DT1000 consists of a keyboard



DT1000 Series Data Terminals

control panel, display panel, 2770-compatible communications electronics and a tape drive.

Peripherals include card and paper tape readers, line printer and serial character printer.

Typical OEM prices in the basic configuration range from \$4,000 to \$6,000 from 10880 Wilshire Blvd., Los Angeles.

Bridge Features New Card Readers

ANAHEIM, Calif. — Bridge Data Products is one keypunch maker who was not scared away from this year's FJCC by the interest shown in the key-to-disk products.

The firm will feature three card readers in booths 3002 and 3004, including two new products. Most of the firm's products handle both 96-column and 80-column cards, making them ideal for mixed card environments, the firm said.

First-time exhibits include a low-speed reader and a new restyled medium-speed reader.

The low speed unit, which is capable of 200 card/min, can be

obtained with optical mark read or RS-232 interface as options. The 8020 only handles 80-column cards and is priced at \$980 in OEM quantities.

The new improved model is the 8045 which reads either pencil marked or punched 80-column cards at a rate of 450 card/min photoelectrically. It sells for \$2,265 in OEM quantities and has an option for reading 80-column stub cards.

The firm will also be showing its Model 8803 card reader, designed for the System/3 end user. Priced at \$6,800, the 8803 can handle 80-column cards, 80-column stub cards, 96-

column cards and 96-column "topless" stub cards. The unit operates at a rate of up to 1000 card/min.

The firm is at 738 S. 42nd St., Philadelphia, Pa. 19104.

CMC Keystations Share Spotlight

ANAHEIM, Calif. — The first display of some of the features found on the CMC 18 key-to-disk system will highlight the exhibit of Computer Machinery Corp.

But the firm will also show the features of its other systems for data entry, including the CMC 5, CMC 7 and CMC 9 at booth 2055. The major part of the exhibit will be given to demonstrations of the CMC 5 system.

The CMC 5 is Computer Machinery's product aimed at the smaller key-to-disk user and features from one to 16 keystations sharing the processor.

In addition, the keystations can be located at remote locations and communicate with the central system over telephone lines. The unit is compatible with other members of the CMC line and a central unit with six keystations is priced at \$990/mo from 2231 S. Barrington Ave., Los Angeles.

Documation Shows P-100 Card Punch

ANAHEIM, Calif. — Documation Inc. will show its P-100 card punch with punching and reading demonstrations promised for the entire time the exhibit floor is open.

The P-100, an 80-column card punch, produces cards at the rate of 100 card/min punching the full 80 columns, but can go up to 300 card/min if 10 columns or fewer are punched. The unit also features 1,000 capacity card hoppers.

In addition to the P-100, the Melbourne, Fla.-based firm plans to show its line of punched hole and mark sense readers, including the recently introduced D series of readers at booths 1578 and 1580.

Inforex Introduces Key-to-Disk Unit

ANAHEIM, Calif. — Inforex will have the major new data entry product in the key-to-disk area on display, but the firm isn't releasing details on the new unit until the day before the conference opens next week.

But in addition to the new product planned for introduction at booths 1025, 1026 and 1027 the firm will display its present line of key-to-disk systems which feature up to 192 recallable 4-level programs, variable length records up to 488 characters, full in-context 125-character record display, data-handling capabilities and data-editing and balancing.

The firm will demonstrate several features of its systems including expanded tape processing, blocking, reformatting, interval timer, 1,600 bit/in. tape drive, off-line communications and printer, the Burlington, Mass.-based manufacturer said.

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CALCOMP

8-Bit Naked Mini 8 Costs \$1,450, Has 1,600 Nsec Cycle Time

ANAHEIM, Calif. — One of the new minicomputers to be shown in booths 47-49 by Computer Automation will include the Naked Mini 8, a byte-oriented 8-bit system said to be four times faster than a PDP-11 or Nova, according to the company.

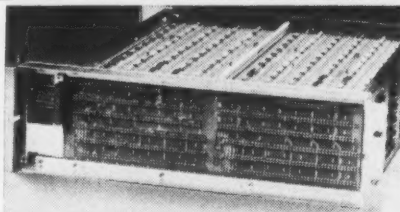
The unit, which features a set of 115

FJCC
OEM Products

instructions is priced as low as \$1,450 in OEM quantities with a standard 4K 8-bit memory. Cycle time is 1,600 nsec.

The unit's instructions contain conditional jumps, immediates, a variety of compare commands, scan, memory-to-memory commands and triple operands.

The unit features three vectored priority interrupts (expandable to 256), two direct memory channels and core expand-



Naked Mini 8

able memories to 32K. Memory parity is optional.

The firm is at 18651 Von Karman, Irvine, Calif.

Printer, Copier Part of Offering

ANAHEIM, Calif. — Hathaway Industries is planning a wide-ranging OEM display for booth 3564.

The firm will show the Model 615 high-speed printer, which it claims is capable of 6,000 line/min operation. The non-impact unit costs under \$6,000.

A non-impact strip printer, the Model 601, operates at 40 char./sec and sells for less than \$400.

The firm is also introducing a facsimile

POS Mini-Disk Memories Ready

ANAHEIM, Calif. — Information Data Systems which specializes in head-per-track disk memories for OEM applications will demonstrate its mini-disk memories for point-of-sale applications.

Also shown in booth 1023 will be special "ruggedized" rack-mounted disk memories for corrosive environments and free-standing large-capacity models.

The units range from 145K bits to over 50M bits with controllers available for

hooking to minicomputers, according to the firm.

Home office is 2020 Winner St., Walled Lake, Mich. 48088.

Floppy Disk Heads Coming

ANAHEIM, Calif. — The Digiwand II magnetic reader pen and a series of heads designed for floppy disk systems will be exhibited by Nortronics Co., Inc., Minneapolis, Minn., at booth 1572. The azimuth-independent wand reads in a circular gap configuration to reduce error rates which occur when the pen is improperly passed over an encoded magnetic strip, the firm said.

The Series FD heads are designed to read 32 and 64 track/in. at a density of 1,600 bit/in., double frequency.

Pioneer Supplies Power

ANAHEIM, Calif. — Pioneer Magnetics Inc. has added an uninterruptible power supply for volatile semiconductor memory systems to its line of OEM multiple output computer power supplies.

The PM 2412 140 Watt convection cooled converter in booth 4548 provides power for up to 32K by 18K MOS random access memories at worst case temperatures, according to the firm.

Inquiries are directed to 1745 Berkeley St., Santa Monica, Calif. 90404.

300 Char./Sec Reader Set

ANAHEIM, Calif. — Remex will show the new Model RR-630 punched paper tape reader which offers up to 300 char./sec asynchronous reading speed and bidirectional operation in booths 2513, 2515 and 2517.

The unit, priced at \$695 with a fanfold handling assembly available for \$100, will be shown along with other perforator, cassette and disk products available from the firm at 1733 Alton St., Santa Ana, Calif.

Transports Transported

ANAHEIM, Calif. — Working demonstrations of the firm's line of OEM cassette transports will be demonstrated by Computer Access Systems Inc. in booth 2522.

The firm, from 2645 E. Buckeye Road, Phoenix, Ariz., will demonstrate applications ranging from paper tape replacement to key-to-tape data entry and high-speed program load.

Data Base Maps U.S. Systems

ANAHEIM, Calif. — Want to find out to whom to sell? Quantum Science Corp. will demonstrate the Maptek IV data base which lists nearly 35,000 computer systems in the U.S.

Each entry includes a phone number, mail contact and/or on-site visit specification, according to the firm.

New to QSC's service is a phone interview and letter-writing service for subscribers to Maptek IV.

QSC is at 851 Welsh Road, Palo Alto, Calif.

Motors, Keyboards Shown

ANAHEIM, Calif. — A display of solid-state keyboards and DC control motors will be featured by Micro Switch in booths 3015 and 3017.

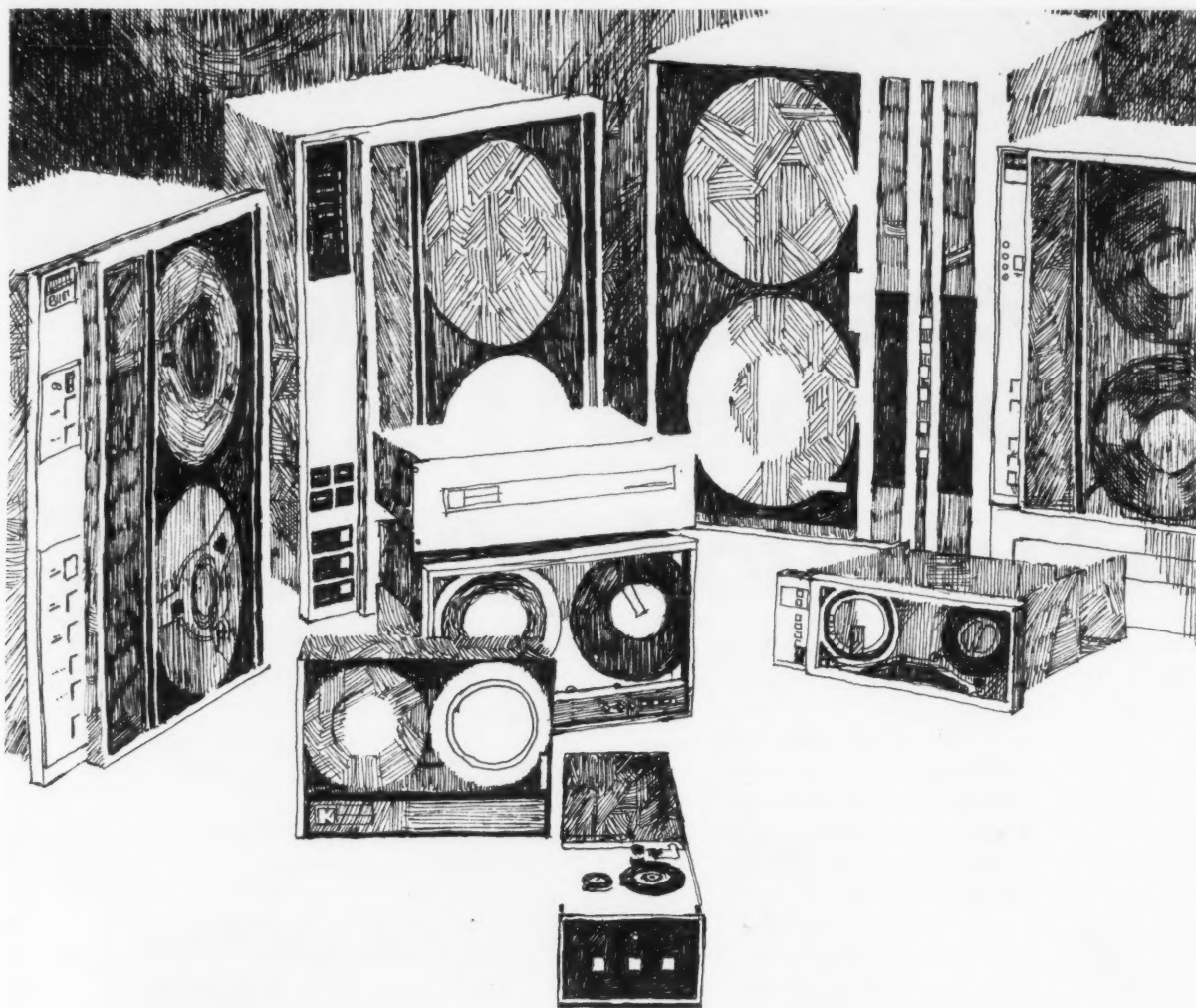
Multi-modal keyboards range from single-unit offerings to one with over 200 keys, according to the firm.

DC control motors — primarily used in computer peripheral applications — include models with both analog and digital tachometers.

Micro Switch is a division of Honeywell Inc.

HP Sends Mini, Drives

ANAHEIM, Calif. — Hewlett-Packard, Cupertino, Calif., will feature an assortment of OEM products, including the 2100A minicomputer, 7970B and 7970E tape drives and the 7900 cartridge disk drive at booth 4045.



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Anaheim, California, Booths 3559-61.

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Litton ABS Highlights Model 30 Printer

ANAHEIM, Calif. — OEM manufacturers will be able to view the new version of the Litton Model 30 serial impact printer which can be bought completely assembled or by component parts and subassemblies.

Priced at \$1,123 in quantity, the printer, in booths 3070 and 3072, features 30 char./sec; 47 printing characters — 26 alpha, 10 numeric and 11 special; electronic tabulation — forward and reverse; red/black ribbon control; split or normal platen; tractor drive with

Votrax Synthesizer Set For Speaking Debut

ANAHEIM, Calif. — The Votrax voice synthesizer from Federal Screw Works, Detroit, will be demonstrated at booths 2056, 2058 and 2060.

The solid-state unit converts digital commands, which may be entered via Touch-Tone telephones, into understandable English. Programming is performed with a keyboard marked with the standard phonetic alphabet and/or word list of ROM vocabulary, and interfaced with the voice synthesis unit.

The synthesizer is available as a peripheral or stand-alone and costs \$2,000 each in quantities over 25.

Librascope Spots Memories

ANAHEIM, Calif. — The complete line of L107 disk memories from Librascope Division of Singer Co., Glendale, Calif., will be exhibited at booths 2064 and 2066. The latest entry, the Model L107B, provides up to 18 Mbit on 256 tracks. All units have average access times of 8.5 or 17 msec.

Models of the Trackball and Joystick interactive controls will also be featured.

Wangco 'Polishes' Disk Drive

ANAHEIM, Calif. — Wangco Inc.'s Series-F fixed-head disk drive, featuring track-to-track access of 8 msec, will be exhibited at booths 2020-22. The drive has a capacity of 24M bits and disk rotation speeds of 1,500 rpm, and costs \$3,200 in quantities.

Raymond Sets Cassette

ANAHEIM, Calif. — The Raycorder Model 6406 cassette recorder will be the highlight of the Raymond Engineering display in booth 2001.

The firm will stress the unit's high-speed search capability and its conformance with Ecma/Ansi specifications. The unit has an average search speed of 60 in./sec, the firm said from 217 Smith St., Middletown, Conn.

Microproducts Star at Intel

ANAHEIM, Calif. — Intel Corp.'s exhibit at booths 41 and 42 features general-purpose microcomputers and plug-in semiconductor memory systems. The Santa Clara, Calif., firm will also show 10 different MOS and bipolar memory systems, including plug-compatible memory boards for IBM.

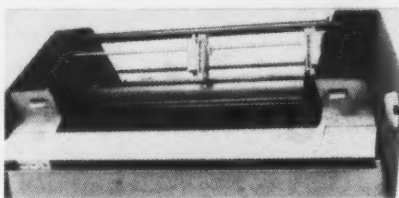
Transports Made for Mini

ANAHEIM, Calif. — PSC Computer Peripherals Division is planning to show a line of mini mag tape transports that range from 7 in. to 10.5 in. real size and feature tape speeds from 12.5 in./sec to 45 in./sec with a packing density from 200 char./sec to 1,600 char./sec.

The Glendale, Calif., firm will also show a line of phase-encoded and NRZI format controllers with option buffer modules.

Multicolor CRT Made

ANAHEIM, Calif. — Thomson-CSF Electron Tubes, Inc., New York City, plans to introduce a new multicolor CRT with an E-21 phosphor screen. A line of display tubes and miniature recording storage tubes for video applications will also be on display at booths 4518 and 4520.



Litton Model 30 Printer

vertical format control; front feed for insertion; and outputs up to six copies.

Diagnostic and service manuals as well as service and maintenance support are available from Litton Automated Business Systems, 600 Washington St., Carlstadt, N.J. 07072.

Diablo Displays Drives

ANAHEIM, Calif. — The 1200 Hytype Printer and Series 30 and 40 cartridge disk drives from Diablo Systems, Inc., Hayward, Calif., will be on display at booths 3006, 3008 and 3010.

The Series 40 drives use the IBM 5440 cartridge and operate at either 1,500 or 2,400 rpm. The Hytype printer uses snap-in print wheels called "Daisies," and can justify both margins and do fine line graphing.

Data Products Heralds Memories

ANAHEIM, Calif. — Data Products Corp. has a new line of plug-compatible memory units at booth 4025 as well as the Model 2230 medium-speed line printer.

The Store/2000 memory features a 1 μ sec cycle time and 400 nsec access time.

FJCC

OEM Products

The 4K by 12-bit unit is designed to be compatible with Electronic Memories and and Magnetic Corp.'s Micro 2000.

The Store/1885, compatible with the Ampex 1800 type memory, has an 850-nsec cycle time and 340-nsec access time. The 8K by 18-bit configuration is expandable to 32K by 18.

The Store/PMM 818 features an 800-nsec cycle time and 270-nsec access time, and has an 8K by 18 capacity. It is also available as the PMM 418, with 4K by 18-bit capacity.

The 2230 printer operates at 300 line/

min and is designed for small systems and terminals.

Other memories, which have been announced but not displayed, include the Store 225 high-density memory, with a 32K by 18-bit capacity and 475 nsec cycle time, and the Store 333M, a militarized version.

Previously announced products, such as the 2310 miniprinter, which operates up to 1,100 line/min, and the 2470 printer, which has a top speed of 1,800 line/min, will also be shown.

Facit Unveils Punch Head

ANAHEIM, Calif. — OEM equipment including I/O typewriters, with drive electronics, paper tape readers, punches, spoolers and reproducers, digital printers and strip printers will be exhibited by Facit-Odhner Inc. in booths 1-3.

The firm will also introduce the Facit Punch Head Mechanism, Model 42-8033-03. The unit has a low noise level and can be used to punch 5- or 8-track paper tape, according to the firm from 501 Windsor Drive, Secaucus, N.J.

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Computer Societies Plan Range of Adjunct Meetings

ANAHEIM, Calif. — Technical committees of many of the computer societies will be taking advantage of the year's largest gathering of computer people, by holding open meetings on a variety of topics.

While this is the usual bill-of-fare for joint computer conferences, it may represent the last time these special-interest groups and committees (Sigs and Sics) can meet on a semi-annual basis, since the joint conferences end this year.

Those meetings open to the public are listed here, except for meetings known to be strictly of a business nature. Most of these meetings include technical papers or panel discussions.

Association for Computing Machinery

Monday, Dec. 4

9 a.m.-5 p.m. Curriculum Committee on Computer Science; includes discussions on small college programs.

8 p.m.-11 p.m. Sig for Installation Management (Sig/cosim); a new product is described, dealing with data security, followed by a panel on "Integrated vs. Separate Control of Data Security."

Tuesday, Dec. 5

8 p.m.-10 p.m. Sig/Communications (Sigcomm). Discussion of plans, report on the October International Computer Communications Conference.

8 p.m.-10 p.m. Sig/Computer Graphics (Siggraph).

8 p.m.-11 p.m. Sig/Programming Languages (Sigplan). Open meeting on the group's "Project Rosetta Stone."

8:30 p.m.-10:30 p.m. Sig/Computer Science Education (sigCSE).

Wednesday, Dec. 6

7:30 a.m.-9 a.m. Sig/Business Data Processing (SigBDP). Business meeting and paper on performance evaluation.

9 a.m.-5 p.m. Curriculum Committee on Computer Education for Management.

2:30 p.m.-4:30 p.m. Sig/Computers and the Physically Handicapped (Siccaph). Panel on job advancement for blind programmers.

2:30 p.m.-5:30 p.m. ACM Standards Committee.

5:30 p.m.-7 p.m. Sig/File Description and Translation (Sigfidet).

6 p.m.-8 p.m. Sig/Computers and Society (Sigcas). Panel and public discussion on "Computers and Consumer Choice."

6:30 p.m.-10 p.m. Sig/Information Retrieval (Sigir). Papers and discussion on interactive information retrieval systems.

8 p.m.-10 p.m. Sig/Artificial Intelligence (Sigart). Talk on robot research.

8 p.m.-10 p.m. Sig/Computer Use in Education (Sigcue). The computer in learning situations.

8 p.m.-10 p.m. Sig/Design Automation

(Sigda). Design automation of custom MOS devices.

8 p.m.-10 p.m. Sig/Symbolic and Algebraic Manipulation (Sigsam). Interactive design and automatic programming of

ACMers to Speak Out

ANAHEIM, Calif. — The officers of the Association for Computing Machinery (ACM) plan to hold another forum to allow direct discussions with members.

The first member/officer forum was attended by about 120 ACM members, during the association's annual conference last August in Boston.

ACM Vice-President Jean Sammet will chair the meeting, 6:15 - 7:45 p.m., Wednesday, Dec. 6, at the Disneyland Hotel.

management information systems at Project MAC.

8 p.m.-10 p.m. Sig/University Computing Centers (Sigucc). Discussion of techniques for selecting computers for academic computer centers in universities.

8 p.m.-11 p.m. Sig/Programming Languages (Sigplan). Discussion on "variable free programming."

Thursday, Dec. 7

9 a.m.-5 p.m. ACM curriculum committee on computer education for management.

9:30 a.m.-5 p.m. Siccaph Panel and group discussion, continuing the topic of job advancement for blind programmers, and "new publications for the blind through interactive braille and audio terminal systems."

8 p.m.-11 p.m. ACM Council (governing body).

Friday, Dec. 8

9 a.m.-5 p.m. ACM Council

IEEE Computer Society

Tuesday, Dec. 5

2 p.m.-5 p.m. Computer Communications.

Wednesday, Dec. 6

9 a.m. to noon. Technical committee on Computer Architecture.

2 p.m.-5 p.m. Education committee.

4 p.m.-6 p.m. Fault tolerant computing.

Thursday, Dec. 7

9 a.m.-noon. Pattern recognition.

Friday, Dec. 8

9 a.m.-4 p.m. Governing board.

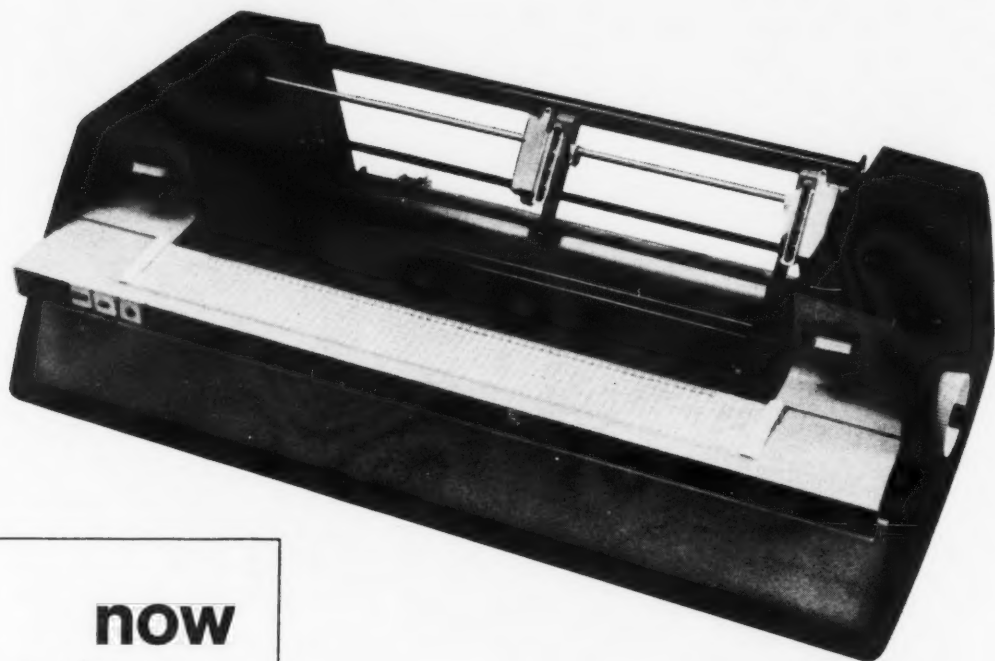
Societies Set Plans For Open Meetings On Education, Graphics

ANAHEIM, Calif. — The prospect of having schools, associations, industry and the government working for a common goal of computer education will be examined during a special panel discussion at the FJCC.

Overall topic will be "Computer Education for Bachelor Degrees," and the meeting will be held from 3 p.m.-5 p.m. Wednesday, Dec. 6, sponsored by the Afips Education Committee.

There will also be a workshop on computer graphics in medicine, sponsored by two ACM special interest groups on the two days preceding the conference (Dec. 3-4).

All these events, and the other events listed on this page, will take place in the Disneyland Hotel; times are sometimes subject to change, and sponsoring organizations have cautioned members and the general public that times and rooms should be certified upon arrival at the Disneyland Hotel.



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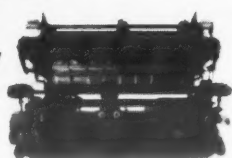
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we'll go
to pieces

Our standard specs. 30 cps. 47 print characters (26 alpha, 10 numeric, 11 special characters). Electronic tabulation, forward and reverse. Red/black ribbon control. Split and normal platen. Tractor drive with vertical format control. Front feed form insertion (cut forms or unit sets). Up to 6 copies. Diagnostic guide. Field service and maintenance anywhere in this world. Your options. Automatic line finder. Stand or table-top.

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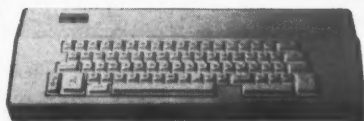
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'Only Game in Town'

Tired of the Sessions? Give Disneyland a Visit

By E. Drake Lundell Jr.

Of the CW Staff

ANAHEIM, Calif. — Computer users traveling here for the FJCC will have to forget the jargon of roulette, blackjack and craps learned at last year's joint in Las Vegas and bone up on Mickey Mouse, Cinderella, Donald Duck and Goofy, because Disneyland is almost the only game in town.

Unfortunately for FJCC visitors, it may be hard to fit in a visit to Disneyland with the busy schedule of sessions and floor exhibits during the convention, since the park will only be open between 10 a.m. and 6 p.m. while the show is on.

A Disneyland visit the day before the show opens will not be possible either since it is closed on Mondays and Tuesdays during the winter season.

But for those who can fit in a visit, the conditions should be near perfect: the weather is expected to be in the middle 70's and the park will be relatively uncrowded with somewhere between 10,000 and 15,000 visitors expected daily during the week of the Joint.

The visitor to Disneyland can get a pretty good feeling for the park in half a day, even though a full day is better and you will still miss some rides.

It's more fun if you have some children along but can also be relaxing for the busy DP manager tired of bits and bytes.

One of the best ways to fit the Disneyland visit into the crowded Joint schedule would be to plan to have lunch or an early dinner at the park — there are over 30 restaurants in the park — and a few hours of sightseeing.

One word of warning. While it won't cost you as much as Las Vegas did if you were a big loser, Disneyland can be expensive. Most of the good rides cost 85 cents — and you'll want to go on a lot of them.

To help alleviate this problem, Disneyland offers specials. One book of tickets for rides that would normally cost \$9.30 can be purchased for \$4.95 at the gate, for example. Other deals will also save money for the visitor planning to go on several rides.

The only drawback to these package deals is that they contain tickets for a lot of rides and attractions that you might not want to use, but generally they are a good deal.

Another attraction is a four hour guided tour of the park, which gives you a quick overview of the park and allows you to pinpoint the attractions most appealing to your tastes for later visits.

In order to give busy DP managers a guide to the park, the following is a quick tour of the high spots of Disneyland. It is not meant to be inclusive, but rather suggests what can be done in a short time.

Disneyland's 73 acres of park land is divided into seven "lands": Main Street, Tomorrowland, Fantasyland, Frontierland, New Orleans Square, Adventureland, and Bear Country.

The visitor enters the park on Main Street, which is a replica of a small town circa 1900 and which is crowded with various shops for film, flowers, souvenirs, etc.

The Santa Fe & Disneyland Railroad leaves from here and circles the perimeter with stops in most of the other lands.

The main attraction on Main St. is "Great Moments with Mr. Lincoln," mostly for history buffs or those interested in animation techniques.

Main Street also features rides on "old time" fire engines, horseless carriages, double-decker buses and street cars. For nostalgia buffs, there is a penny arcade.

From Main Street, the visitor can stroll up to the town square, the hub of the park, with all of the other lands branching off.

Adventureland features the Jungle Cruise, a journey through Africa and Asia

which takes the visitor past alligators, hippos and elephants. Cannibals reportedly "threaten" the boat. This is one of the most famous rides in Disneyland and still one of the best.

Adventureland also features the En-

Disney Data

chanted Tiki Room, with a musical comedy by 225 animated characters and stories of the South Seas, and the Swiss Family Treehouse.

New Orleans Square has Dixieland bands and some of the best rides in the park. The Pirates of the Caribbean is a ride through waterfalls, trappers' boat-houses and looting pirates in a small boat. For those who get past the roaring cannons and cannonballs, as well as a flaming village, imprisonment in a powder room

awaits — and the room is about to explode. This is a must ride.

New Orleans Square is also the home of the Haunted Mansion with 999 ghosts and some of the best restaurants and shops in the park.

Bear Country is the newest of the lands; the main attraction is Country Bear Jamboree, a group of animated singing and dancing bears.

The Davy Crockett Explorer Canoes are also found here with the visitor helping to paddle the canoe. It's good exercise and the best attraction in this section of the park.

Frontierland is the next stop and is one of the biggest lands in the park. One can ride through Nature's Wonderland either by train or by pack mule and see some 204 animated animals and birds, the living desert, and beaver valley. Watch out for the geyser and the balancing rocks.

The Rivers of America are in the center

of this land and can be seen on the Mark Twain, a paddle wheel steamboat, nice for a leisurely ride, or on the Mike Fink Keel Boats.

Visitors can also explore Tom Sawyer's island, by taking a short trip on the river rafts, or take a ride on the "Columbia," a replica of the first U.S. ship to sail around the world.

The Golden Horseshoe Saloon is also found in Frontierland. It features a stage show and a chance to sit down and rest your weary feet — all for the price of a Pepsi.

Fantasyland is great for the kids, but hard working DP managers might find the charm of Alice in Wonderland, Casey Jr. Circus Train, Dumbo Flying Elephants, King Arthur Carousel, the Mad Tea Party, Snow White's Adventures, Sleeping Beauty castle and Storybookland a bit much.

(Continued on Page 42)

WITH OUR NEW 370/STOR, YOU HAVE NO MORE REASONS TO BUY IBM MAIN MEMORY.

370/STOR is the new add-on and replacement main memory for IBM System/370 Model 155. From Cambridge Memories.

We designed it with one goal in mind: to convince even the most cautious buyer that 370/STOR is far superior to any alternative 370/155 main memory. Judge for yourself.

FIRST, IT'S "FAIL-SAFE."

In 370/STOR, if a sector of memory fails, it is reassigned immediately to the highest address level, and the rest of the memory keeps running. That means almost zero downtime due to memory failure. No other memory has such a feature.

FACT 2. IT IS EXTREMELY COMPACT.

One 370/STOR unit has the capacity of four IBM memory cabinets. We store up to two megabytes in the same space that IBM stores 512 kilobytes. That saves floor space, machine room changes, and time during upgrade. No other memory has such a feature.

FACT 3. IT IS FIELD-EXPANDABLE.

After you install a minimum 370/STOR module, we can expand it up to an additional 1.75 megabytes by simply plugging cards into your installed unit. As a rule of thumb, figure that we can add about 512K bytes in about two hours. It's as easy as opening two cabinet doors. No other memory has such a feature.

FACT 4. NO COSTLY CENTRAL PROCESSOR MODIFICATIONS.

To add IBM memory to your Model 155 requires processor modifications. These cost from \$12,000 to \$125,000, depending upon the number of "ports" your memory uses. 370/STOR uses only one port per two megabytes, so there is absolutely no requirement for processor upgrade. That alone can be a huge savings. No one else offers such a feature.

FACT 5. WE'LL GUARANTEE 72-HOUR EXPANSION.

Once you install a 370/STOR memory, we will upgrade it within 72 hours after contract approval if you desire. Our experience as one of the largest suppliers of add-on core for System/360 taught us that when a user wants more memory, he wants it fast. And let's face it, we want to make a point: no one else could possibly offer such a service.

FACT 6. THE PRICE STORY.

We saved the best for last. 370/STOR saves you from 30 to 60 per cent, not including the substantial processor savings that you'll enjoy. To convert that to dollars: two megabytes of memory from IBM costs approximately \$1,000,000. From Cambridge, it costs \$480,000. You save over a half a million dollars. Our lease terms are just as attractive.

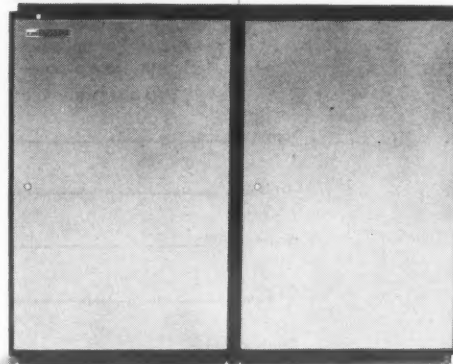
370/STOR is completely hardware and software compatible with any of the seven models of the 370/155, in case you had that concern. And although its unique operator console makes maintenance a breeze, we service 370/STOR from over 150 locations in the U.S. So you can put that issue aside.

That's our story. Since you're probably a cautious buyer, call our local sales office and make us prove our pitch.

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Disneyland Dining Delivers Delights For Both the Gourmet and Casual Eater

ANAHEIM, Calif. — In addition to many fine restaurants in town here and in the outlying vicinity, Disneyland itself has more than 30 restaurants to offer.

Most of these are just snackbars where you can get a quick sandwich, but there are a few more interesting eating places. The diner planning lunch or an early dinner here should be forewarned, however, that liquor of any kind is banned from the park.

Victorian Atmosphere

The Plaza Inn on Main Street has ham, roast beef and chicken, plus fruit bowls and salads in a Victorian atmosphere. The Plaza Pavillion provides out-of-doors dining and features fried chicken.

Ice cream is naturally the specialty at the Ice Cream Parlor and there is a sidewalk cafe for coffee, sandwiches and pastries in the Main St. area.

New Orleans Square offers the Blue Bayou Restaurant — probably the best in the park open during the winter — with specialties such as sea-

food creole and flaming Bananas Foster dessert.

Quick service is the hallmark of the French Market in this area, and there are three smaller restaurants featuring ice cream or fruit drinks.

Bear Country features the Golden Bear Lodge, a glorified snack bar, and the "mile long" bar for your favorite soft-drinks and snacks.

Frontierland has the Casa de Fritos for Mexican dishes including hot tamales, enchiladas, and tacos, as well as the River Belle Terrace for pancakes and waffles.

In addition, there are the Oaks Tavern, Wheelhouse, Delta Banjo, and Indian Village Dugout for American sandwiches and the El Zocolo Wagon for Mexican snacks.

Fantasyland features a restaurant on the Pirate Ship built for the movie "Peter Pan" and several snack bars.

Tomorrowland Terrace looks at the future kitchen; with infrared broilers and automatic cooking devices the restaurant can serve as many as 4,000 people an hour. The Terrace also features rock bands during the day.

Disneyland-- the Fun Place to be When JCC Work Is Done

(Continued from Page 41)

The Skyway to Tomorrowland is a must for its view of the entire park.

In Fantasyland you can also take a boat ride "through white water channels," or a drive on the Autopia in small cars.

A big attraction here is It's a Small World, which features animations of children from more than 100 nations.

Tomorrowland may give you some idea of things to come, with one of the largest operating monorails in the nation that runs around part of the park and to the Disneyland Hotel.

The Submarine Voyage ride is the main attraction here, and well worth the price — Disneyland claims to have the world's eighth largest undersea fleet with eight submarines, each of which is 56 feet long and carries 38 passengers.

The Matterhorn Mountain Bobsleds ride is the amusement park's roller coaster. A definite must for roller coaster freaks.

The People Mover is an idea of how people might get to work in the 21st century and the rocket jets ride gives a spectacular view of Tomorrowland.

In all, Disneyland should provide a welcome break for busy DP people at the show — even if they just wander the grounds watching the antics of the Disney characters and the other DP people there.



Break Time

Disneyland employees take a breather during preparations for FJCC opening.

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General Automation Sets Stage for Mini DMS Unit

ANAHEIM, Calif. — At booth 4525, General Automation will have the first public showing of the mini DMS systems for IBM 1130 replacement, in addition to two other active demonstrations and one static display.

The mini DMS system, a scaled Operating System Of HP 3000 Set

ANAHEIM, Calif. — General business-oriented users with a need for time sharing and batch processing will be the focus of the Hewlett-Packard booth 4045 as the firm demonstrates for the first time the operating system for the HP 3000 computer systems.

The firm will demonstrate simultaneous time sharing, real time, and batch capabilities of the operating systems as well as operation in Basic, Fortran and Cobol.

Hewlett-Packard is at 11000 Wolfe Rd., Cupertino, Calif. 95014.

Acoustinets on Job

ANAHEIM, Calif. — Users interested in curbing noise pollution can visit the Gates Acoustinet, Inc. exhibit of noise reducing enclosures for business machines.

Featured at booth 1508 will be the new Acoustinet to quiet the CDC 222 printer and demonstrations of other Gates noise-reducing equipment for Telex, TWX, and automatic typewriters.

AM Features Copiers

ANAHEIM, Calif. — The AM 5000 electrostatic office copier that makes 50 copy/min will be exhibited by the Multigraphics Division of Addressograph Multigraph Corp., Cleveland, Ohio, at booths 1051 and 1053.

The Continuous Total Copy System that turns out 150 copy/min and reduces printout to 8 1/2 in. by 11 in. will also be displayed.

Training Films Viewed

ANAHEIM, Calif. — Data Processing Education Network (DPEN) is a new exhibitor and will demonstrate at booths 3011 and 3013 a library of color video-tape training programs that can be accessed from a standard television set.

Basis of the system is a keyboard device that allows the user to interact with the TV images for participation in the education process.

DPEN is at 437 Madison Ave., New York, N.Y. 10022.

Van San Quiets Noise

ANAHEIM, Calif. — Soundoff Dampeners, acoustical enclosures designed for use with impact printers will be introduced by Van San Corp., Pasadena, Calif. at booth 4003. The firm will also display dampeners for teletypewriters.

Lorain Simulates UPS

ANAHEIM, Calif. — The Lorain Products Corp. booth 3558 will feature a console that simulates operation of the firm's Continuac Inverter System, an automatic uninterruptible power supply system (UPS). Units are available in capacities from 15 kW to 600 kW.

down version of the firm's 18/30 Disk Monitor System, features 2 μ sec cycle time, five standard data channels and peripherals including a 300 card/min reader,

FJCC
Minis and Other
Products

125 line/min printer, and disk drives with a capacity of 512K words and 60 msec average access time.

Standard options for the sys-



General Automation's Mini Disk Monitor System

tem include a 9-track magnetic tape system capable of 25, 37.5 or 75 in./sec, a 400 char./sec paper tape reader, 75 char./sec paper tape punch, and provisions for the addition of three more disk drives.

An educational display in the booth will feature a demonstration of the firm's Vehicle Electrical Tests Systems, which will

actually test a small car in the booth.

The other exhibits planned include a demonstration of the new multiuser Basic, RTOS-16, and Fortran software packages on the SPC-16/40 mini system, and a display of digital and analog I/O modules.

The firm is from 1055 S. East St., Anaheim, Calif. 92805.

Twin Cassette Terminal, Error Test Unit Ready

ANAHEIM, Calif. — The new ASR Model 733 twin cassette terminal will make its debut at Texas Instruments' booth 2500. The unit, part of the Silent 700 line, operates at 10, 15, 30 and 120 char./sec with a simultaneous transmit and receive capability.

Another new product, the 969 computer-controlled error data test system, will also be displayed, along with the Model 988 general-purpose mini and the 725 portable terminal, the Houston firm said.

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'Economics on Our Side'**Service Bureau Caters to Banks' Individual Needs**

COLORADO SPRINGS, Colo. — A computer service bureau here specializing in bank data processing offers full service and expanding freedom to customize programs for individual needs and desires.

"Competing services, at least in this area, usually offer only one set of programs," according to Dan H. Patton, director of computer marketing services for Kaman Sciences Corp. "A bank has to do things their way or not at all. In contrast, we wrote master programs which have plug-in holes for options."

Kaman stresses the individuality of each customer's needs, Patton noted. For example, Bank A may want to charge 1% interest a month, while Bank B wants to charge 1-1/2%. Bank A may also want to transfer funds in \$25 increments, whereas Bank B wants to do it in \$100 increments. With us, they can each do as they please.

"The same thing applies to our savings programs, plus every other service we offer. In this way, we can process for any number of competing banks, and each can retain individuality, serving its customers and seeking new ones as management feels is desirable.

"We also stress marketing to our bank customers and work with them in a consultative role.

"The economics are all on our side," he said. "Take the example of a bank in Colorado Springs, an institution with about \$20 million in assets which had its own MICR system.

"After figuring all of their costs — equipment, personnel and supplies — they learned it was costing them \$12,000/mo to do their own processing. We're charging them only \$8,000/mo for a better job."

The Kaman Computer Center has two Control Data 6400 computers and an

NCR Century 100 computer. The former have been modified to perform business applications in addition to their original scientific usages, while the latter serves as a front-end data capture device.

The company must maintain a large staff of systems analysts and programmers to do its own work. This talent is available to outside customers on an hourly fee basis.

"There are other factors, too, which run up costs for the small computer user who tries to do it himself," Patton said. "How many banks and small businesses have the raised floor and air conditioning and humidity controls that EDP requires? And consider supplies. We buy millions of forms at a time, which means we're getting substantial volume discounts."

The Computer Center was established in 1961 with installation of an IBM 1620 to support the internal scientific work. It wasn't long, Patton reported, before local business firms were asking the company to perform relatively small processing jobs. The IBM 1620 was replaced by a CDC 1604 in 1963, a CDC 3400 in 1965 and the first 6400 was installed in 1967.

By 1967, the company realized that this could become a very profitable sideline. It was also determined then that banks were prime prospects.

"Their business is regular, which is important to a company that is subject to the periodic ups and downs of Federal Government contracts," Patton noted, "but beyond that banks are influential. Start doing their processing, and they recommend you to their customers."

To do bank data processing, Kaman Sciences installed an NCR 315. By 1970, the service bureau activity had grown so that the second CDC 6400 was acquired and the first NCR system was replaced with a 16K Century 100.

This last step was accompanied by a change in operations in that the bank processing was shifted to the CDC 6400s, and the smaller computer was used only



Dan H. Patton, director of marketing computer service for Kaman Sciences Corp., looks at a computer report with one of the operators of the company's NCR Century 100 system.

to capture data and prepare it for input.

To accomplish this, documents are sorted and fed to the Century system with an NCR MICR reader-sorter, which processes 1,200 document/min regardless of size.

Data captured by the reader-sorter is put out for temporary storage on a twin-spindle disk unit, which has two packs that can accommodate more than 8M bytes of information. Using the system's printer, which is rated at 450 alpha and 900 numeric line/min, a printout is created for balancing against the proof machine totals supplied by the banks.

Any necessary corrections as well as

MICR-sort rejects, new accounts and file changes, are indexed on an NCR 32 or 35 accounting machine, both of which are wired to paper-tape punching units. The tape is input to the computer for disk amendment via a free-standing paper tape reader that can transmit 1,500 char./sec.

Finally, the file is transferred to magnetic tape for input to the CDC 6400s via one of two free-standing magnetic tape drives which can transmit 40K char./sec.

"We make cost-efficiency studies on all of our EDP work," Patton explained. "Sometimes it's more economical to put a job on the Century. In addition, we use the NCR Century for considerable off-line printing for the 6400s.

Next Target

"Our next major marketing target is going to be hospitals. We'll offer complete programs for everything from accounting to patient billing, and this we expect to divide in the most cost-effective manner between the Century and the 6400s. Most likely it will be similar to the banking operation, with the Century used for the capture system."

By mid-1971, Kaman was processing for 16 banks, seven of them in Colorado Springs but the others scattered, including one 170 miles away. The customers ranged in size from \$5 million to \$50 million in assets.

Kaman plans to increase its marketing territory through remote terminals. It will install its first NCR 720 shortly.

Although combined daily transactions for the 16 banks sometimes hit a high of 100,000, Patton said the average would run closer to 70,000. Through arrangement with the Federal Reserve System, the banks' letters are delivered directly to Kaman so input data can be prepared during the day.

**OF ALL THE COMPANIES
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Productivity Up With Professional Keyboard Training

By Judith Kramer
Of the CW Staff

Professional keyboard operator training programs are doing what they're supposed to do, and very well, according to users in a *Computerworld* survey.

Production and morale increased while costs and errors decreased when operators were trained by specialized outside agencies, most users stressed.

"We thought we should be able to improve our key-entry speed but didn't quite know how," said Larry Wergin, director of management information, Looart Press, Colorado Springs, Colo.

"We felt that having new equipment could only do so much. The training was probably the biggest thing we could do."

Wergin went to Malt Keyboard Dynamics, Valley Forge, Pa., to provide training for 13 operators on Friden key-to-tape equipment.

"We've just about doubled our throughput this year over last. Our operators are

averaging 15,000 keystroke/hr and one girl is reaching 25,000 keystroke/hr."

"Morale was also quite a bit higher this year than last," Wergin said.

The Malt technique is not just skills improvement, according to James J. Barrett, Malt president. "We analyze the factors that make a good operator and then set our goals beyond this."

Although turnover was never a big problem at Looart Press, there were always "a few who would leave if they had a chance for better work. Since the Malt training, we've had none leave for that reason."

When asked if he thought operator training was the best opportunity for increasing profits, Wergin said: "It's the best I know. We've tried other in-house programs to try to increase productivity, but I don't think anything has had nearly the impact of this specialized training that Malt provides."

Another Malt user is the *Philadelphia Inquirer*. "We had tried one skill improve-

ment program before, but it didn't work too well. We were impressed with the professionalism of Malt," said Joe Powell, assistant production manager.

Ten unskilled operators who had no knowledge of typing were trained on Nabcor keyboards. After five weeks they were averaging 10,000 keystroke/hr, and are now averaging 15,000 to 18,000 keystroke/hr.

John Werner, assistant production manager at the *New York Times*, had also tried other training methods before turning to Malt. "Our operators were trained by high schools, self-instruction, audiovisual materials, but the Malt training was the best."

This was due, he felt, to Malt's careful evaluation of individual operator errors. There was a significant improvement in production, he said, which is an "important consideration for increasing profits."

The Travelers Insurance Co., Hartford, Conn., had used other in-house programs

for training its keypunch operators, but after a sample run with Keyboard Training Inc., New York, decided to try it.

Although he could not reveal exact figures, Frank Collins, director of operations, said the operators were much more productive.

"The way they handled themselves when they were in our shop was very professional. The operators not only didn't resent it but enjoyed it very much. We had operators write us notes and thank us."

Collins agreed that professional training can lead to increased profits.

Gilbert E. Arbuckle, check-processing manager for the Mellon Bank, Pittsburgh, went to Keyboard Training two times: first when he changed equipment and then for additional employee training.

"There was a definite increase in production. The difference between our KTI trained and non-KTI trained was about 200 keystroke/hr.

The operators really liked the program, he said.

Arbuckle has been able to decrease the number of operators in his group with the added throughput, and "this naturally increases profits."

The *Danbury-News Times*, Danbury, Conn., was also very pleased with the KTI training which resulted in a 60% decrease in error rate and a 45% increase in speed, according to Pat Crooks, assistant to the president.

The training improved the overall efficiency of our operation and was very well received by the operators, Crooks said.

Jim Connolly, DP center manager for Mobil Oil, Philadelphia, wanted to compare the KTI method with his own program. "We wanted to find out whether what we were doing in our training cycle was better than or even with (KTI) or should be developed more."

He also found the operators more productive with the KTI training.

Bus Schedule System Off to a 'Flying' Start

By Joseph Hanlon
Special to Computerworld

KINGSTON-UPON-HULL, England — A computerized bus schedule system which is saving this city \$84,000/yr cost only \$2,000 more to produce than a manual schedule. Introduced successfully this summer, the schedule is the first application of the system claimed by its developers at Leeds University to be the most advanced program of its kind in the world.

The timetable of trips is still built in the normal way, then Vampires (vehicle and mileage pruning in running essential services) is used to assign buses to these trips. The assignment task is often the most difficult because many peak period

trips are nonstandard: special trips to factories or schools or to provide additional service just on the heavy portions of regular routes.

With many possibilities to consider, a human scheduler may not notice the same bus could do a school trip and then go completely across town in time for a factory trip.

In this city the timetable for the evening rush hour has 376 trips with 140 different end points. When buses were assigned by human schedulers working alone, 115 buses were required.

With the aid of Vampires, the number of buses needed to run the same timetable was cut to 108. It is estimated that

staff and maintenance cost \$12,000 per bus per year, almost independent of how many miles the bus travels. Thus, cutting the number of buses by seven saves \$84,000.

Vampires was developed by the operational research unit of the University of Leeds, and is used to assign buses in three cities.

The program, run on an ICL 1906A, starts with a predetermined timetable and produces the best schedule for each of several numbers of buses, with any overlapping assignments clearly flagged. A human scheduler adjusts trips to remove any impossibilities and produce the final schedule.

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We're to COM what Kodak® is to cameras.

With Interlinked Data Communications

Job Control Data Forges Ahead Here

By Jack Seltz

Special to Computerworld

IRVINE, Pa. — To say that production operations at National Forge are integrated may be an understatement. They are highly integrated and heavily computerized.

Starting with customer specifications, the company manufactures precision steel products, such as large diesel engine and compressor crankshafts, turbine rotors, marine propulsion shafting, pressure vessels and nuclear components almost from "point zero" raw ingots.

Multiply this by approximately 10,000 pieces and perhaps 1,000 open work orders at any given point in time, and the size and scope of the company's control problem are readily apparent.

National Forge has succeeded in an increasingly complex situation by applying computer-assisted control techniques. The latest module in the manufacturing system is an advanced job information reporting network that reports the progress of each piece through its production cycle as well as form the basis for comprehensive production status reports.

The objective of the reporting network, built around a data communications system, is to enable the company to:

- Reduce lead times.
- Reduce work-in-process inventory.
- Better control production and production costs.
- Promise favorable delivery dates, and meet them efficiently and profitably.

Specifically, "hard" benefits which the system has produced to date include \$86,000 annual net savings in costs and a 25% reduction in data recording from the previous system.

Fifty "toaster-sized" data entry readers at the company's Irvine and Erie plants form the backbone of the system. By "reading" plastic cards, the input devices continually record job status information. In addition, the readers handle maintenance reporting, capital reporting, machine utilization logging, and time and attendance clocking for almost 1,500 employees.

The Erie data communication system feeds information from the IBM 2790 readers into a System/3 linked via telephone lines to a larger 360/44 in Irvine. The S/3 produces reports for Erie plant management, and the 360 processes the major computer-based functions for both National Forge plants.

Interlinked data communications has given the company a much sharper picture of its integrated manufacturing operations than was ever before possible. Based on the information gathered, the system produces a series of daily comparison reports; for example, exception reports flag situations that require immediate management attention.

Conversion to the 2790 system from previous methods — an IBM 1030 system at Irvine and a manual system in Erie — went quickly and smoothly, thanks to enthusiastic support from management at both plants.

The system represents a dramatic improvement over previous methods of job reporting, because it eliminates the paperwork and punched cards required for a job packet. Each job is identified by a single plastic card, which is inserted in the reader. Other information is entered into the reporting system with a plastic employee ID badge, and by using dials and switches on the reader unit.

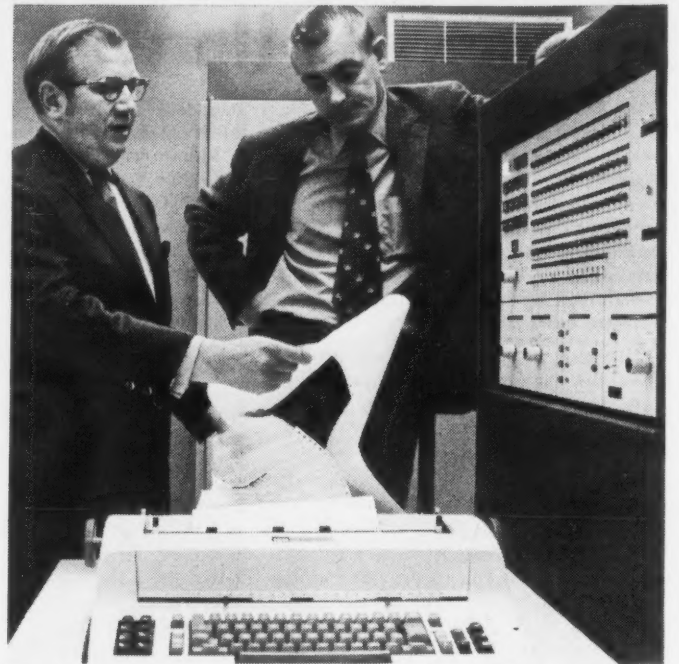
National Forge's data communications system incorporates eight area stations at the Irvine plant and four area stations in Erie, with a total of seven printers for local communications with foremen and supervisors. Information can be entered into the system from the area stations, including exception items such as pay rate changes during a shift and work order updates for tooling purposes.

At Irvine, the area station printers record the progress of all jobs handled within a department, based on input from the readers, so the foremen and schedulers can determine immediately when an operation is completed on the plant floor.

At midnight, information from all three shifts is used to update cumulative records, and to produce the reports daily.

- Daily time comparison.
- Daily labor distribution.
- Status report.

These daily reports are reviewed by the foremen and schedulers at the start of each shift. The summaries are designed to point up any problems,



Checking the output on a typewriter linked to a 2715 transmission controller are Andrew F. Henry, corporate manager of systems and data processing, and Roger J. Hyde, manager of operations.

so they can take corrective action quickly.

Another file that is updated in the processing of information from the three shifts contains job costing data for all work in process. While individual job costs are reported automatically at shipping time, the firm can obtain data on request while the job still is in process by inserting a "finder" card. Plans are for this and other production information to be instantly available through computer terminals which directly access the computer files.

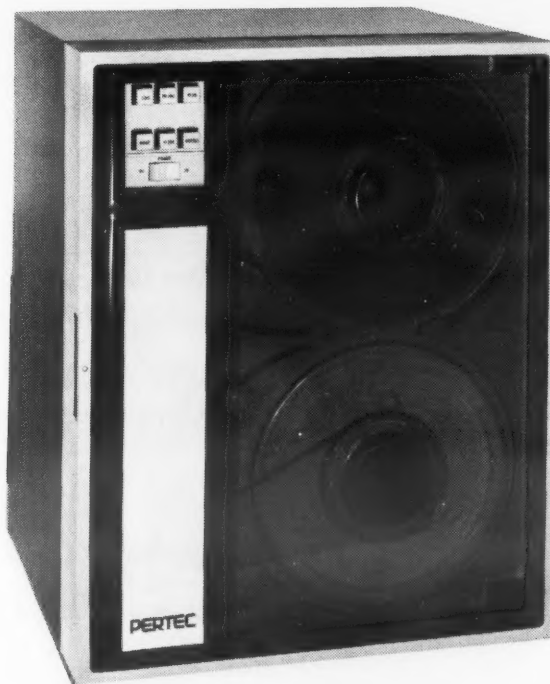
On a weekly basis, the system produces a master index of jobs to be done — by department.

Also reported weekly for production control is a summary of total machine load hours, by week and by machine or machine center. While this is now supplemented by a machine load detail report, the detailed report will not be necessary when on-line inquiry is installed. The goal is a true "real-time" operation, in which management can check the progress of any job — "right now."

National Forge's 360 now produces production planning and marketing information in addition to the other reports.

J. Seltz is vice-president, management systems, at National Forge Co.

Pertec introduces the new T8000 Transport.



Controls to Cut Methadone Abuse

ATLANTA, Ga. — Computer controls here are eliminating abuses in methadone treatment programs for drug addicts so prevalent in other parts of the country.

The system operates from an IBM 360/50 at the University of Georgia attached to remote terminals in the state's treatment centers.

The centralized system counteracts the problem of patient mobility, where addicts can enter treatment programs at different locations and receive more than one dose per day.

The network provides each drug treatment center with a record containing identification and treatment data on all patients. Each morning, centers receive transaction forms for each patient scheduled for treatment that day noting the prescribed methadone dosage to be administered.

With the individual transaction record a shipping list is provided for inventory count of bottled methadone dosages on

hand from the previous day. This list meets the strict auditing and inventory control demanded by the Justice Department.

Centers also receive a daily computer listing of patients who did not show up for previous appointments with a medical history of the overdue or suspended patient.

The computer system records every time a patient receives methadone, every time counseling is provided, and records the results of urine samplings.

If a patient misses two visits, the computer automatically designates him as "overdue" and directs the treatment center to have him contact a physician.

On the state level, the computer calculates the amount of methadone used at all centers and the amount remaining in stock. A forecast is made each day of expected amounts needed the next day to determine safety stock levels.

The system generates daily and weekly operational reports and provides statistical reports for program officials.

The 360/50 operates under DOS, using a specially designed on-line monitor for inquiry and update functions. The daily treatment and inventory outputs as well as the regular reports are produced by batch programs run each night after all treatment is ended.

The batch program processes all patient records sequentially and operates in less than 100K bytes of core. The system is presently handling several thousand patients throughout the state.

American Management System, designer of the Georgia system, is currently developing a similar system for the state of Tennessee. The Tennessee system will handle alcoholic patients in addition to the methadone patients.

Future plans include a complete south-eastern regional system providing common patient control over a multistate area.

Too Much Earthquake Coverage, Firm Finds

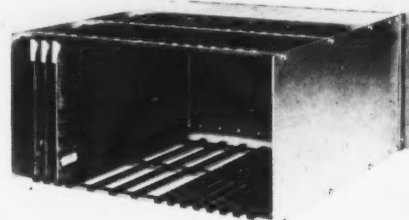
RIVERSIDE, Calif. — A computer model of a building's susceptibility to earthquake damage was a manufacturing firm's impetus to change insurance policies, for a savings of about \$54,000 a year.

The analysis of the building's construction indicated the new \$5 million plant had a 90% chance of suffering \$10,000 in earthquake damage over the 25-year life of the building, a 40% chance of \$50,000 in damages, and a 4% chance of \$800,000 in repair costs.

The building owner had been paying \$54,000 annually on earthquake insurance, but his policy had a \$1 million deductible proviso.

Using the analysis developed by Albert C. Martin & Associates, the owner decided to underwrite his own insurance.

Most Manageable Mini



A VIEW FROM THE BUSINESS END SHOWS:

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2. A Universal Bus with 12 slots for memory and peripheral interfaces.
3. Vertical mounted boards large enough to accommodate 100 integrated circuits.

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2. A Universal Bus which allows you to start with a basic, simple, powerful computer at lowest cost. When YOU want to add memory or I/O controllers, simply plug them in. You can get 65K bytes in the box and still have slots for 8 I/O interfaces. A Universal Bus allows peripherals to communicate with each other or with memory without consultation with the central processor. Direct memory access is standard.
3. Vertical mounted boards let convection do the cooling. The capacity of a large number of integrated circuits per board minimizes the number of connectors. When we then operate all components at a fraction of their rating and use large connector fingers with low density spacing we offer you an ultra reliable computer.

AND ABOUT THE FRONT OF THE BOX:

It has 4 sense switches, push buttons for run, halt/step, reset, load and interrupt. There is a key switch to enable. Then there are lights to indicate run, halt, link and overflow. Oh yes, it is only 8 3/4" high and with the rack ears attached, fits a standard rack.

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The Peripheral Power

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COMPUTER INDUSTRY

CI Notes

Lockheed Counters DEC Suit

LOS ANGELES — Lockheed Electronics has filed an action in U.S. District Court here asking the court to dismiss a patent infringement suit filed against it by Digital Equipment Corp. in Boston.

The Lockheed action contends that the patent infringement suit was filed "without good cause" and seeks to prohibit Digital from maintaining its present suit or any other suit for infringement of patent #3614741.

The cross action also asks for a declaration that DEC's patent on memory addressing techniques is invalid and not infringed by the Lockheed SUE minicomputer products.

CDI "Links" With Greyhound

SAN JOSE, Calif. — Control Data Institute and Greyhound Computer Corp. have entered into a "host" leasing agreement providing computer systems to train entry-level computer programmers and operators. Under GCC's "host" facility arrangement both CDI and GCC share the use of the computer system.

The new San Jose installation will be an IBM System 360/30, with a full complement of peripheral equipment including disk and tape storage.

Supershorts

Kybe Corp. has won the Department of Commerce's "E" award for "significant contribution to the nation's export program."

System Development Corp. has entered into a joint venture in Japan with Japan Systems Corp. with a 34% interest in System Development Corp. of Japan, Ltd.

Storage Technology Corp. has formed a wholly owned subsidiary, Storage Technology GmbH, to be headquartered in Frankfurt, Germany.

The computerized betting system used by Off-Track Betting Corp. in New York City is being offered to Canadians by Computer Sciences Canada, a subsidiary of the developer of the system, Computer Sciences Corp.

Interactive Data Corp. has acquired the Standard & Poor's automated pricing services, which covers stock and bond pricing, municipal bond pricing and the dividend services formerly offered by S&P.

Shell Sekiyu K.K. has become the first user of the ASI-ST Data Management System in Japan. The sale of the installation was made by Software Products Co. of Hong Kong, the Far East marketing representative of Applications Software, Inc., developer of ASI-ST.

Mini Makers Back in Force

Exhibits Reflect Strong OEM Orientation

By E. Drake Lundell Jr.
Of the CW Staff

ANAHEIM, Calif. — The Fall Joint Computer Conference opening here next week will be flavored with a strong OEM product orientation despite attempts by the sponsoring American Federation of Information Processing Societies (Afips) to make the show more meaningful to end users.

At the same time, the last Joint promises to be the most successful in terms of booth space and exhibitors in three years, indicating to many observers a turnaround in the state of the computer industry economy.

Even though Afips is sponsoring a heavily user-oriented technical program with special vertical sessions aimed at specific user industries, the exhibit space will again be divided pretty evenly between firms marketing their wares to other companies in the computer industry and those with a more end-user orientation.

tation.

One example of the OEM orientation can be seen in the case of Mohawk Data Systems. Last spring the firm put its exhibit dollars strongly behind its end-user products at the Joint, but this year the booth will feature only OEM products.

"We haven't even told our end-user marketing people to send out invitations to the show," a spokesman said.

He indicated there were two factors behind the decision to push only OEM products.

First is the location of the show in southern California, an area noted for its heavy computer industry activity, and therefore potential contacts for OEM sales.

The second is internal — Mohawk is revitalizing its OEM efforts hoping to make OEM sales account for more than its present 20% level of the firm's revenues. "There is a major corporate commit-

ment to the OEM side of the business," the spokesman said, "and we feel the FJCC is a good stage to emphasize this commitment since we expect 85% of the people coming to the show to be from industry and therefore good contacts for this business."

Mohawk will concentrate on seven OEM products ranging from printers and magnetic tape drives through card readers, disk drives, peripheral controllers to paper-tape equipment.

The mini makers, which are back in force at this show, will also emphasize OEM product lines, with the major new computer introductions in this area from Computer Automation and General Automation.

It was reported that Afips was having trouble trying to squeeze late-comers into the exhibit area, a nice problem after three years when exhibit space went begging.

Nixdorf Takes Over Victor's DP Unit

PADERBORN, West Germany — The 14th subsidiary for Nixdorf Computer AG will be in the U.S. January 1.

Last week, the company announced its intention to boost its U.S. sales by acquiring the computer division of Victor Comptometer Corp. of Chicago. Until now, Victor had the exclusive marketing rights to Nixdorf equipment in the U.S., with the equipment being sold under the Victor banner.

Nixdorf, which is primarily active in the small computer market in Europe, estimates its 1972 computer sales will reach \$130 million, hardly enough for it to challenge IBM.

But, on the other hand, Nixdorf is closely allied with the movement underway in Europe for a unified computer industry made up of the computer companies from France, Germany and The Netherlands, a link which could give the

firm's entry into the U.S. stronger backing than it could provide on its own.

Under the arrangement, Nixdorf will acquire all the assets of the Victor group, including 11 branch offices and it will maintain the present organization, including the 470 U.S. employees.

At the same time, Nixdorf said it planned to "expand its penetration of the U.S. market by increasing the marketing organization and introducing additional products" to the U.S. during 1973.

President Heinz Nixdorf commented that a company cannot consider itself a truly national organization until its support staff numbers 2,000. He anticipated the U.S. operation would be at that level within about two years.

"The optimum would be 4,000," he said. While declining to pinpoint when this level might occur, he suggested the growth might parallel his German operation, which took four years to reach its present level of 4,000 support people.

This growth would take such a long time because all new Nixdorf employees are required to undergo extensive training. Sales personnel are responsible for a full installation, including programming, other Nixdorf sources explained.

On the whole, the company produced some 5,500 systems last year. Its current U.S. base is 1,000 sites, with each system wearing the Victor label.

Nixdorf projected near-term growth to 600 new systems in the U.S. next year, plus 1,000 already on order by Commercial Credit Co., the CDC subsidiary.

One of the first orders of business will be the establishment of three to five new sales offices where only service offices



CW Photos by Edward J. Bride

Ehrlich and Nixdorf comment on planned growth of their U.S. marketing organization.

exist now, according to Peter Ehrlich, director of foreign marketing. U.S. headquarters will officially open in Chicago on Jan. 1, he added.

Ehrlich also said the Nixdorf growth would be from the Victor nucleus, and that the German company did not plan on an invasion of European marketing or technical people to boost this growth.

The Victor organization was "not dense enough" for a national effort, Nixdorf commented, adding "this forced us to make the investment" in acquiring the division.

The acquisition will cost Nixdorf some \$10 million in the next 18 months, he said. The Victor computer division was not profitable, and the current loss is expected to be less than \$2 million, just about half of last year's deficit, other sources said.



Heinz Nixdorf shows his System 820, the small system that will receive most of his company's effort in the U.S.

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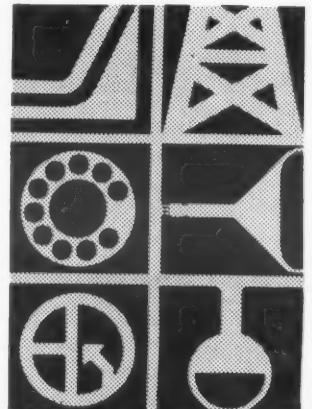
- Responsibility Level Reporting
- Project Status—Projected Completion
- Trouble Analysis
- Attendance Reporting
- Personnel Inventory

Analysis

- Client and Department Costs
- Staff Performance
- Trouble Areas
- Estimating Guideline Efficiency

Support

- Installation
- 42 Days On-Site
- Training



At Computer '72

More Than 100 U.S. Firms to Exhibit in London

LONDON — Many of the computer industry marketing men at the Fall Joint next week will have one eye on an even larger exhibition taking place here.

Computer '72, scheduled for Dec. 4-8, will have well over 200 exhibiting companies and about 100 of them will be U.S.-based firms, including many of the mainframe makers who have decided to bypass the joints for other conferences.

In addition to almost 50 U.S. firms showing on their own

during the four-day extravaganza, the U.S. Trade Center here has taken 61 booths in which more than 85 U.S. companies will show their data processing wares, including 17 who will be entering this market for the first time.

The Trade Center exhibit, which will all be in one section of the show, will be the largest single exhibit here, and including the other U.S. manufacturers exhibiting, it seems likely that almost as many U.S. firms will

be represented here as will be on the floor in Anaheim.

This heavy concentration of U.S. firms in the European show once again emphasizes the need for foreign markets for expanding U.S. companies, now that the major growth in computer equipment shipments seems to have shifted outside the U.S.

The seminar program for the conference is designed for two types of audience — the computer industry and general business executives who use computers — in much the same way as the American Federation of Information Processing Societies (Afiips) has begun to structure the joints.

The seminar program, organized by the British Institute of Management, will hold two concurrent series of sessions — one based on general interest topics and the other on topics of interest to computer industry executives.

The major sessions include an overview of computing in Europe; a session on whether or not computers aid business efficiency; one on data banks and privacy; the future of Cobol and

Fortran; and one on the shape of computer use in the future.

Other subjects include efficiency and security in the computer room; the computer in the smaller company; and sessions on the use of minicomputers and intelligent terminals.

In addition to the large U.S. representation at the show, Eastern European computer experts will also be well represented with committees planning to visit the meeting from Poland and Hungary, as well as other

Eastern European computer groups.

From the U.S., Control Data, Honeywell, NCR and Univac will hold up the mainframe section, but most of the U.S. exhibitors will be in the terminal, data entry and tape and disk area, with several firms displaying in each category.

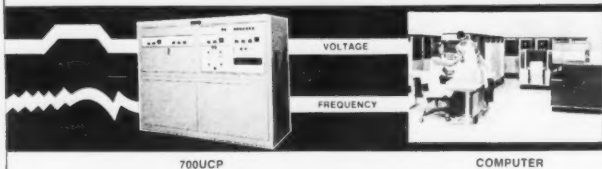
IBM, however, will forego exhibiting in this show, and International Computers Ltd., the largest manufacturer in Britain, will not be present either.

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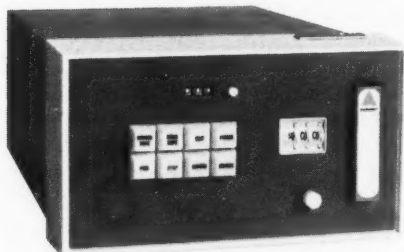
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Digitronics Sets First Product Since Merger

SOUTHBORO, Mass. — The Digitronics Division of Iomec has made its first announcement since its merger into Iomec earlier this year.

The new paper tape unit, the 4040, is designed to complement the firm's Model 2540 and operate synchronously up to 300 char./sec right to left, with 400 char./sec rewind.

Selling for \$1,170 in single-unit quantities, the device can handle 320 ft of 4.5 mil tape or 580 ft of 2.5 mil tape in widths from 11/16 in. to 1 in. and either 5- or 8-level codes.

And the expansion in the paper tape area is expected to be just the first of a series of announcements planned by the combined firm over the next several months in order to broaden its product line in the peripherals area.

ATC Sets Contract Suit

NEW YORK — Atlantic Technology Corp. has filed a \$19.5 million suit against a New York investment firm, F.S. Smithers & Co., and two of its officers.

The display manufacturer's suit seeks \$9.5 million in actual damages and \$10 million punitive damages in connection with a \$1.2 million equity financing that Smithers was to have arranged.

The suit charges Smithers with breach of contract and fiduciary obligations and violations of the Securities and Exchange Act of 1934.

Atlantic Technology, which recently filed for reorganization under Chapter 11, said it needed the equity financing as part of an arrangement with Randolph Computer Corp. that was to have provided it with up to \$14 million in lease financing to produce its ATC-2000 display terminal.

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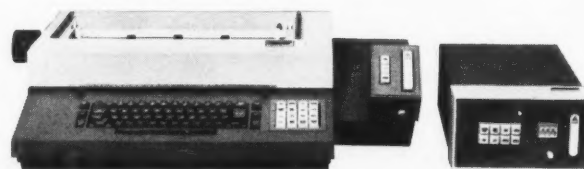
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Novar 5-51 and 5-61 Systems, with multiple tape units, perform the functions of telecommunications, teleprocessing, error-free power typing, automatic typing, and can be used for high speed interoffice terminal-to-terminal communications. When used with ATS, these systems provide for editing, insertions, corrections and re-ordering of data. A lot of capability in a desk-top unit!

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ADR President Writes Justice:

User Won't Benefit From Redistribution of Market

By a CW Staff Writer

PRINCETON, N.J. — The breakup of IBM into separate manufacturing facilities "would only be a minor step toward creating a healthy data processing industry," John Bennett, president of Applied Data Research, charged recently in a letter to the Justice Department.

This action or a consent decree would only reduce "IBM's dominance over the computer hardware market," and the "prime benefactors would be other computer manufacturers and not the government or the public," he stated.

In a letter to Thomas E. Kauper, assistant attorney general for the Antitrust Division, Bennett charged that "in all fairness to IBM, all computer manufacturers are responsible to some degree for the poor use of computers in the U.S. and throughout the world.

"Even if Honeywell, Burroughs, Sperry Rand, NCR, CDC, XDS and DEC and others were to share the market equally with IBM, there would be little benefit to the government or commercial user," he added, noting "IBM's umbrella and profits would simply be more equitably distributed among the other manufacturers."

Such a redistribution, according to Bennett, "would do almost nothing for the computer users; certainly it would not reduce prices. At best, it might ensure that the other hardware companies would stay in busi-

ness; however, given their present profitability, it is doubtful that [they] would be seriously threatened even if the status quo were maintained."

The secret to increased performance, he said, is the cost and quality of the software efforts, and he noted "the performance of hundreds of thousands of programmers is directly a function of the software tools available to them" in the form of operating systems, computer languages, compilers, programming aids, measurement tools, sorts and data management packages.

Currently, many of these tools and other software are given to the user free by manufacturers, he said.

Easily Susceptible

"The 'free' program tie-in, along with a sales presentation, which understates the required programming effort, can seduce the naive prospect. Too frequently, unsophisticated users are misled by unrealistic representations of the potential benefits and ease of use of computers — e.g., it only requires three weeks or less of training school to turn a company's clerks into productive programmers."

Because computer manufacturers normally only price their hardware, he said, "manufacturers produce the minimal software necessary to sell their computers. Each software expenditure is evaluated in terms of its contribution to selling more

hardware.

"Under such conditions," he added, "the user is the loser, since independent software companies which cannot compete against free software are forced out of the market. Thus, no revolutionary computer software is developed and few innovations or improvements are made."

Because of this, "IBM's monopolistic software sub-industry, therefore, is the real cause of the ineffective use of computers, rather than IBM's control of the hardware industry," he said.

Therefore, Bennett recommended that "if the Justice Department and the government expect to improve and simplify the operational use of computers and to reduce the costs of programming for government users and the business world, the following steps must be taken:

- "IBM must be required to separate its programming operations into a separate and independent subsidiary.
- "All IBM software, both existing and planned, must be fairly priced.
- "IBM must be restricted from the development of specific systems and applications software for a period of 20 years. These restrictions might be in areas where there has been a demonstrated capability outside IBM.
- "A competitive software environment must be created as quickly as possible.
- "Safeguards must be imple-

mented to ensure that a competitive software industry, once established, will remain outside the domain of IBM. One such safeguard would be to require that any separate IBM software subsidiary receive information on new IBM developments only at the same time it is released to independent software companies."

In addition, ADR said moves could be made now under the 1956 Consent Decree between the government and IBM in order to help restore competi-

tion to the industry.

In that action, Bennett noted tie-in sales of data processing equipment were prohibited and he suggested software could be looked at like other DP equipment so that requiring the user to purchase some software with his computer would constitute a violation of that decree.

"In summary," Bennett said, "we believe it is imperative that the Justice Department bring all legal weapons to bear in order to develop a competitive software products industry."

UCC Spinoff Promises Net

DALLAS — A spinoff from University Computing Co.'s Computer Utility Network Division has been revealed with ambitious plans for a network of computer centers.

Utility Network of America, headquartered here, presently has facilities in Chicago with a Univac 1108 "especially tailored for remote batch processing" and in Washington, D.C., with a Control Data 6400, again configured for remote batch jobs.

Most of the personnel comes from UCC, with the organization headed by Leo J. Mott, formerly president of the UCC operation, as president and chief executive officer; Donald Brooks, formerly vice-president of Eastern operations at the UCC division, a vice-president; and several other UCC vice-presidents, including Richard H. Coleman, Glenn W.

Schmidt and Richard F. Mayhew.

The group was formed "to provide organizations with an alternative or addition to their own in-house computer facility," according to Mott. "We'll concentrate on providing enhanced computer power itself rather than attempting to solve everyone's specific problems. Our intent is to make available to users all the large-scale computer power they need, whenever they need it, at attractive prices," he added.

The firm was formally established two months ago, Mott revealed, and currently is serving 50 customers with revenues running at an annual rate of \$2.5 million. The firm will open a computer facility on the West Coast during 1973, Mott said.

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OCR Market Expected to Grow, Potential Of Key-Entry Combination Also Cited

MOORESTOWN, N.J. — Spurred by the end of the recession in the DP industry and new applications in total data-entry systems, the market for optical character readers can be expected to grow, Datapro Research Corp. indicated in a recent report.

The computer industry research firm noted, however, that "the optical reader industry is a puzzling one. It has made court jesters out of several prophets."

For years, Datapro said, the OCR market has been "on the verge of taking off," but "performance has consistently fallen below predictions."

"Also, there has been little change in the pecking order of the established companies. In each of the three distinct classes of optical readers (mark readers, bar-code readers and character readers) the leaders remain un-

changed.

"IBM continues to lead the way in optical character readers, with Control Data a close second. In the field of bar-code readers, Addressograph-Multi-graph still holds sway. And Optical Scanning continues to read more marks than anyone except IBM."

While the "true size of the market for optical readers is virtually impossible to derive," Datapro said the best estimates indicate character reading equipment currently installed runs to around \$200 million to \$300 million, with the total number of character readers in the 1,500 to 2,000 range, a number which has not grown substantially in the past two years.

"The other types of optical readers probably number substantially more, but have a lower installed value because of the great difference in average price per unit between character readers and other readers," the firm added.

While the depressed economic climate has generally held back the use of such devices, Datapro indicated that "in addition to the trauma associated with equipment conversion, use of optical readers often means substantial changes in procedures, which can lead to high implementation and training costs."

The high cost of data-entry operations — particularly the high labor content — is the major reason users will look more and more to OCR equipment for their data-entry needs, Datapro

predicted.

"Boosters of OCR," the firm went on, "visualize inexpensive remote terminals that can read hand printing, or conventional typing, thus simplifying data entry. It is a worthy goal, but it does not seem practical at this time."

On the other hand, however, the use of mark readers to transmit relatively small amounts of information appears practical and will increase in use.

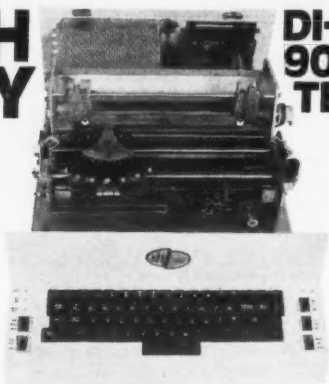
The most exciting development in the last year in the optical reading area, Datapro indicated, was the announcement of "total" systems that provide facilities for both key entry and OCR.

"Scan-Data and Cummins-Chicago have recently announced combination optical reader/key-to-tape systems.... Both offer potential users more flexibility in using optical reading so that both can handle a larger share of a user's data preparation requirements than optical reading by itself."

But while users seem to desire this increased flexibility in data entry, the firm warns that "the success of the combination optical reader/key-entry systems... will depend heavily on the manner in which these companies build, market and service the systems."

"But the potential of the combination system is that it may be the idea that will finally bring optical reading fully into the real world of data processing," Datapro added.

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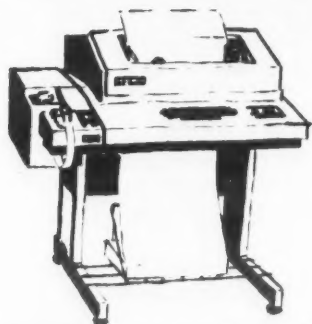
NEW YORK — The Association of Data Processing Service Organizations (Adapso), which earlier was highly critical of the handling of public information in the U.S. Government IBM antitrust suit, has changed its tune.

The organization recently commended Chief Judge David Edelstein, who is hearing the case, for his "significant and pervasive steps to insure that public information was available to the press

and other interested parties with regard to the IBM litigation."

Th actions of the judge "have made it possible for our members and the industry generally, as well as the public, to keep informed of the major events taking place in this crucially important antitrust litigation," according to Bernard Goldstein, president.

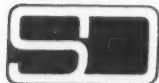
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UCC Shows \$38.9 Million 3d Period Loss

DALLAS — University Computing Co. apparently decided that while it was showing a loss for the third quarter from a couple of writeoffs, it would show a big loss.

The result was a whopping \$38.9 million loss, or \$4.75 a share: after sales of two subsidiaries for a loss of about \$22.1 million, a \$9.7 million write-

down in peripheral equipment and a \$7.2 million loss from other adjustments and write-downs.

In the 1971 period, restated earnings were \$1.1 million, or 15 cents a share.

But for the nine months, the loss was reduced to \$26.2 million, or \$3.20 a share compared with earnings of \$5.2 million, or

69 cents a share last year.

Revenues, excluding insurance operations and operations expected to be sold, were \$26.4 million for the quarter, compared with \$31 million a year ago.

In the nine months, the figure declined to \$82.1 million from \$92.3 million in the 1971 period. The decline in revenues "is due largely to a decrease in revenues from computer equipment leasing during 1972," the firm said.

Among the major factors in the loss were:

- Provision for a pre-tax loss of \$19.6 million related to the proposed sale of the firm's communications equipment manufacturing subsidiary to Harris-Intertype Corp. for about \$20 million cash.

- Provision for pre-tax loss of \$2.5 million on proposed sale of

life insurance subsidiary of UCC's Gulf Insurance Co. to Nationwide Corp. for about \$12.5 million cash.

- A \$9.7 million writedown in carrying value of peripherals owned by the firm.

- Other adjustments and write downs, totaling \$7.2 million due to the settlement of an equipment purchase contract, an investment writeoff, a currency revaluation and other adjustments, UCC said.

The proposed sale of the manufacturing subsidiary would eliminate a requirement for "heavy cash investment" — and the incoming cash from the sale of assets and a restructuring of the firm's bank debt "all point toward a strengthened financial position and an improved ability to make further investment in Datran, UCC's data transmission subsidiary."

Nickels & Dimes

IBM has declared a regular quarterly cash dividend of \$1.35 per share payable Dec. 9 to shareholders of record Nov. 14. \$\$\$

Mathematica expects sales in the \$9 million to \$10 million range in fiscal '73, compared with \$7.5 million in '72. \$\$\$

Controls Research, keyboard manufacturer and subsidiary of Midtex, recently reported a backlog of \$10.4 million. \$\$\$

Computility decided to absorb a \$30,172 special charge in the third quarter. The result: a \$2,079 profit vanished into a \$53,555 loss. But in the nine months, losses were reduced to \$49,963 compared with \$141,193 in the same 1971 period. \$\$\$

Sykes Datatronics' backlog at the beginning of October exceeded \$4 million in orders and ongoing programs. The Series 2000 Tape Cassette System has received "enthusiastic response." \$\$\$

Calcomp has broken out its revenue producers for 1972 with graphic products sales and leases accounting for 36%, of total revenues, an increase of over 20% compared with 1971.

Revenue supplied by sale of memory products (tape and disk units) to the OEM market fell off 25% from 1971, and accounted for 31% of total revenues. Price reductions were the major factor, the firm said. However, a 50% rise in OEM revenues in 1973 is forecast.

Revenue from end-user sale and lease of memory products was about 27% of total revenue, a whopping rise of 260% over 1971. For 1973, a revenue rise of 40% is projected. \$\$\$

Graham Posts Revenue Gain in First Period

GRAHAM, Texas — Graham Magnetics Inc. scored an 11% rise in sales for the first quarter ended Sept. 30, and operating earnings soared 41%, but, stripped of its tax-loss carry-forward used in previous years, the tape maker's earnings declined slightly.

Revenues rose to almost \$2.4 million, from \$2.1 million a year ago. There was a "substantial" increase in commercial sales during the recent period, compared with a year ago, when about 25% of the sales were in government contracts, observed President George A. Jagers.

Earnings totaled \$279,403, or 31 cents a share compared with \$284,027, or 42 cents a share in the 1971 period when a \$133,480, or 20 cents a share special tax-loss credit was utilized.

Operating earnings reached \$400,403 compared with \$284,027 for the first quarter a year ago.

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AN IBM 360/65... replaces a 360/50 at Computer Power, Inc., a large mortgage servicing company headquartered in Jacksonville, Florida. After evaluating the possibility of upgrading to a 370/155, Computer Power decided that the sheer power of the Model 65 offered a far better solution — and at a better price — over the 155. This six-year lease agreement with Randolph was a natural follow-on of a very effective Randolph cost-control lease on the replaced Model 50. Mr. David Hicks, President of Computer Power, stated "I felt that Randolph was attuned to our growth pattern, and was genuinely interested in helping us control our hardware costs".

— RCC —

A LEADER IN... the textile industry, Fieldcrest Mills, with sales over \$250 million, is sold on leasing its EDP hardware. And

this aggressive North Carolina-based company sought out Randolph for its peripheral equipment leasing. "We heard that Randolph was an easy company to do business with and we decided to find out for ourselves", said Bill Barbour, EDP Manager at the Fieldale, Virginia Mill. "Randolph has always been responsive to our needs, flexible on terms and conditions, and anxious to tailor the lease contracts exactly to our needs."

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Model 30 - extended from 64K to 128K. American Broadcasting Company, Hollywood, California.



Model 30 - extended from 64K to 128K. Gant Shirtmakers, New Haven, Connecticut. Leased from Rockwood Leasing.



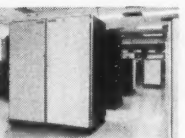
This could be your installation. We've got any capacity you need.



Model 30 - extended from 64K to 128K. XCS Management, Vancouver, British Columbia. Leased from National Computer Rental.



Model 50 - extended from 64K to 128K. Further expansion to 192K planned. Grace, Minneapolis, Minnesota.



Model 50 - extended from 256K to 512K. State Comp. Insurance Fund, San Francisco, California.



Model 30 - extended from 64K to 96K. Toronto School Board, Toronto, Ontario, Canada. Leased from Greyhound Leasing.

To date, Fabri-Tek has over 150 installations of 360 extension memories. And, IBM has agreed to maintain all these CPU's which have been modified by the addition of Fabri-Tek extension core memories. For further information, call (612) 935-8811 or write FABRI-TEK INC., 5901 South County Road 18, Minneapolis, Minnesota 55436, leader in Memory Technology For Over A Decade.



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360 CORE YOU CAN TRUST

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Computerworld

Stock Trading Summary

All statistics
compiled, computed
and formatted by
TRADE*QUOTES, INC.
Cambridge, Mass. 02139

CLOSING PRICES WEDNESDAY, NOVEMBER 22, 1972

| | 1972 RANGE (1) | CLOSE NOV 22 1972 | WEEK NET CHNGE | WEEK PCT CHNGE |
|--|----------------------|-------------------------|----------------------|----------------------|
|--|----------------------|-------------------------|----------------------|----------------------|

SOFTWARE & EDP SERVICES

| | | | | |
|------------------------|--------|--------|--------|-------|
| O ADVANCED COMP TECH | 1- 3 | 1 5/8 | - 1/8 | -7.1 |
| A APPLIED DATA RES. | 3- 7 | 3 1/4 | - 5/8 | -16.1 |
| O APPLIED LOGIC | 1- 4 | 3 1/8 | - 1/8 | -3.8 |
| N AUTOMATIC DATA PROC | 72- 99 | 95 | +1 1/2 | +1.6 |
| O BRANDON APPLIED SYST | 1- 2 | 3/4 | 0 | 0.0 |
| O COMPUTER DIMENSIONS | 5- 14 | 4 1/2 | - 3/4 | -14.2 |
| O COMPUTER DYNAMICS | 1- 4 | 1 3/8 | 0 | 0.0 |
| O COMPUTER NETWORK | 3- 7 | 4 1/2 | +1 5/8 | +56.5 |
| N COMPUTER SCIENCES | 4- 10 | 4 1/4 | - 1/8 | -2.8 |
| O COMPUTER TASK GROUP | 1- 2 | 1 1/4 | + 1/8 | +11.1 |
| O COMPUTER TECHNOLOGY | 4- 8 | 4 | 0 | 0.0 |
| O COMPUTER USAGE | 7- 14 | 7 7/8 | + 1/4 | +3.2 |
| O COMP AUTOMOT REPORTS | 5- 9 | 7 1/2 | - 3/4 | -9.0 |
| N COMPUTING & SOFTWARE | 14- 28 | 16 1/4 | 0 | 0.0 |

| | | | | |
|------------------------|--------|--------|-------|-------|
| O COMRESS | 1- 3 | 1 1/8 | - 1/8 | -10.0 |
| O COMSHARE | 5- 10 | 7 1/2 | - 5/8 | -7.6 |
| O DATATAB | 5- 9 | 4 3/8 | - 1/8 | -2.7 |
| O EDP RESOURCES | 2- 8 | 3 | 0 | 0.0 |
| A ELECT COMP PROG | 1- 5 | 1 5/8 | - 1/8 | -7.1 |
| N ELECTRONIC DATA SYS. | 43- 65 | 59 1/4 | 0 | 0.0 |
| O INFORMATICS | 5- 11 | 5 1/8 | - 1/8 | -2.3 |

| | | | | |
|-----------------------|-------|--------|-------|------|
| O I.O.A. DATA CORP | 1- 3 | 1 | 0 | 0.0 |
| O KEANE ASSOCIATES | 4- 7 | 4 | - 1/4 | -5.8 |
| O KEYDATA CORP | 7- 13 | 10 1/4 | - 1/2 | -4.6 |
| O LOGICON | 4- 9 | 5 | 0 | 0.0 |
| A MANAGEMENT DATA | 4- 10 | 5 | + 1/4 | +5.2 |
| O NATIONAL CSS INC | 8- 31 | 29 1/4 | 0 | 0.0 |
| O NATIONAL INFO SRVCS | 2- 5 | 1 5/8 | 0 | 0.0 |

| | | | | |
|------------------------|--------|--------|-------|-------|
| P ON LINE SYSTEMS INC | 8- 28 | 27 | - 1/2 | -1.8 |
| N PLANNING RESEARCH | 6- 17 | 8 1/8 | + 1/4 | +3.1 |
| O PROGRAMMING METHODS | 20- 25 | 25 3/8 | + 7/8 | +3.5 |
| O PROGRAMMING & SYS | 1- 2 | 1 | - 1/8 | -11.1 |
| O RAPIDATA INC | 5- 27 | 24 3/4 | - 3/4 | -2.9 |
| O SCIENTIFIC COMPUTERS | 2- 4 | 2 | - 1/8 | -5.8 |
| O SIMPLICITY COMPUTER | 1- 5 | 2 1/2 | - 1/2 | -16.6 |

| | | | | |
|------------------------|-------|-------|-------|-------|
| O TBS COMPUTER CENTERS | 3- 6 | 3 1/4 | 0 | 0.0 |
| O TCC INC | 1- 3 | 5/8 | - 1/8 | -16.6 |
| O TYMSHARE INC | 7- 11 | 8 1/2 | - 1/4 | -2.8 |
| O UNITED DATA CENTER | 5- 8 | 6 1/4 | 0 | 0.0 |
| M UNIVERSITY COMPUTING | 9- 26 | 9 3/4 | + 3/4 | +8.3 |
| A URS SYSTEMS | 6- 10 | 7 3/8 | - 1/4 | -3.2 |

PERIPHERALS & SUBSYSTEMS

| | | | | |
|------------------------|--------|--------|--------|-------|
| N ADDRESSOGRAPH-MULT | 34- 49 | 34 3/4 | +1 | +2.9 |
| O ADVANCED MEMORY SYS | 12- 23 | 17 7/8 | -1 3/8 | -7.1 |
| N AMPEX CORP | 5- 15 | 7 1/8 | + 3/4 | +11.7 |
| O ANDERSON JACOBSON | 5- 8 | 4 7/8 | + 1/8 | +2.6 |
| O ATLANTIC TECHNOLOGY | 1- 11 | 1 1/4 | 0 | 0.0 |
| O BEEHIVE MEDICAL ELEC | 1- 6 | 6 1/4 | + 1/2 | +8.6 |
| A BOLT, BERANEK & NEW | 5- 21 | 14 | +1 | +7.6 |

| | | | | |
|------------------------|-------|--------|-------|-------|
| M BUNKER-RAND | 9- 14 | 9 7/8 | + 1/2 | +5.3 |
| A CALCOMP | 9- 25 | 9 1/4 | - 1/8 | -1.3 |
| O CAMBRIDGE MEMORIES | 9- 15 | 10 1/2 | - 3/4 | -6.6 |
| O CENTRONICS DATA COMP | 6- 27 | 24 | 0 | 0.0 |
| O COGNITRONICS | 2- 5 | 2 1/8 | - 1/8 | -5.5 |
| O COMPUTER COMMUN. | 1- 7 | 3 1/2 | +1 | +40.0 |
| A COMPUTER EQUIPMENT | 3- 4 | 2 1/2 | 0 | 0.0 |

| | | | | |
|----------------------|-------|-------|-------|-------|
| O COMPUTER MACHINERY | 7- 13 | 9 5/8 | - 3/8 | -3.7 |
| A COMPUTEST | 3- 9 | 4 1/8 | 0 | 0.0 |
| A DATA PRODUCTS CORP | 3- 7 | 3 7/8 | - 1/4 | -6.0 |
| O DATA RECOGNITION | 1- 5 | 1 1/2 | + 1/4 | +20.0 |
| O DATA TECHNOLOGY | 2- 5 | 2 3/4 | - 1/2 | -15.3 |
| O DI/AN CONTROLS | 0- 8 | 4 1/2 | + 1/8 | +2.8 |
| N ELECTRONIC M & M | 3- 8 | 4 1/8 | - 1/8 | -2.9 |

| | | | | |
|------------------------|--------|--------|-------|-------|
| O FABRI-TEK | 2- 5 | 3 1/2 | + 3/8 | +12.0 |
| O GENERAL COMPUTER SYS | 7- 16 | 7 1/4 | - 3/4 | -9.3 |
| M GENERAL ELECTRIC | 59- 70 | 67 5/8 | 0 | 0.0 |
| N HAZELTINE CORP | 7- 13 | 8 3/8 | + 1/2 | +6.3 |
| O INFOTEX INC | 20- 36 | 21 5/8 | - 3/4 | -3.3 |
| O INFORMATION DISPLAYS | 1- 5 | 1 1/4 | - 1/8 | -9.0 |
| A LUNDY ELECTRONICS | 8- 14 | 7 3/4 | - 3/8 | -4.6 |

| | | | | |
|---------------------|--------|--------|-------|-------|
| O MANAGEMENT ASSIST | 1- 2 | 3/8 | - 1/8 | -25.0 |
| A MILGO ELECTRONICS | 15- 44 | 17 3/8 | + 5/8 | +3.7 |
| N MOHAWK DATA SCI | 12- 27 | 13 1/8 | - 3/8 | -2.7 |
| O OPTICAL SCANNING | 6- 16 | 7 1/2 | -1 | -11.7 |
| O PERTEC CORP | 8- 17 | 8 1/4 | 0 | 0.0 |
| O PHOTON | 6- 15 | 7 | 0 | 0.0 |
| A POTTER INSTRUMENT | 7- 21 | 9 | - 3/8 | -4.0 |

| | | | | |
|----------------------|--------|--------|--------|-------|
| O PRECISION INST. | 3- 13 | 3 1/4 | + 1/4 | +8.3 |
| O RECOGNITION EQUIP | 5- 15 | 8 1/2 | - 3/8 | -4.2 |
| N SANDERS ASSOCIATES | 13- 21 | 16 3/4 | - 1/8 | -0.7 |
| O SCAN DATA | 5- 13 | 5 | - 1/4 | -4.7 |
| O STORAGE TECHNOLOGY | 17- 39 | 28 1/8 | -3 5/8 | -11.4 |
| O SYCOR INC | 7- 11 | 10 3/4 | + 1/4 | +2.3 |
| O TALLY CORP. | 8- 15 | 10 1/4 | -1 1/8 | -9.8 |

| | | | | |
|-----------------|--------|--------|--------|-------|
| N TEKTRONIX INC | 34- 64 | 46 1/8 | -2 5/8 | -5.3 |
| N TELEX | 6- 15 | 6 1/4 | + 3/4 | +13.6 |
| O WILTEK INC | 10- 26 | 15 1/2 | +2 | +14.8 |

SUPPLIES & ACCESSORIES

| | | | | |
|-----------------------|--------|--------|-------|------|
| O BALTIMORE BUS FORMS | 6- 9 | 6 1/4 | - 1/2 | -7.4 |
| A BARRY WRIGHT | 9- 14 | 11 1/2 | + 3/4 | +6.9 |
| A DATA DOCUMENTS | 17- 26 | 21 1/4 | - 1/4 | -1.1 |
| O DUPLEX PRODUCTS INC | 8- 16 | 9 1/2 | + 3/4 | +8.5 |
| N ENNIS BUS. FORMS | 6- 10 | 6 7/8 | - 1/4 | -3.5 |
| O GRAHAM MAGNETICS | 15- 27 | 16 | -1 | -5.8 |
| O GRAPHIC CONTROLS | 12- 15 | 11 7/8 | - 3/8 | -3.0 |

| | | | | |
|----------------------|--------|--------|--------|------|
| N 3M COMPANY | 76- 86 | 83 3/4 | +2 1/8 | +2.6 |
| O MOORE CORP LTD | 42- 56 | 55 | +1 1/2 | +2.8 |
| N NASHUA CORP | 48- 62 | 56 1/2 | -1 1/4 | -2.1 |
| O REYNOLDS & KEYNOLD | 37- 77 | 48 1/2 | +1 | +2.1 |
| O STANDARD REGISTER | 14- 20 | 16 1/8 | - 1/8 | -0.7 |

| | 1972 RANGE (1) | CLOSE NOV 22 1972 | WEEK NET CHNGE | WEEK PCT CHNGE |
|--|----------------------|-------------------------|----------------------|----------------------|
|--|----------------------|-------------------------|----------------------|----------------------|

COMPUTER SYSTEMS

| | | | | |
|---------------------|--------|--------|--------|------|
| O TAB PRODUCTS CO | 14- 23 | 22 1/4 | + 1/4 | +1.1 |
| N UARCO | 21- 28 | 23 1/2 | +1 1/2 | +6.8 |
| A WABASH MAGNETICS | 6- 11 | 6 7/8 | - 1/4 | -3.5 |
| N WALLACE BUS FORMS | 21- 26 | 24 7/8 | +1 5/8 | +6.9 |

COMPUTER SYSTEMS

| | | | | |
|------------------------|---------|---------|--------|------|
| N BURROUGHS CORP | 147-226 | 214 1/4 | +2 1/8 | +1.0 |
| N COLLINS RADIO | 14- 20 | 19 | +1 5/8 | +9.3 |
| N CONTROL DATA CORP | 43- 78 | 60 1/2 | -1 1/8 | -1.8 |
| O DATA GENERAL CORP | 56-115 | 105 1/2 | +6 | +6.0 |
| O DIGITAL COMP CONTROL | 9- 25 | 6 1/2 | - 1/2 | -7.1 |
| N DIGITAL EQUIPMENT | 72-101 | 88 | +2 7/8 | +3.3 |
| N ELECTRONIC ASSOC. | 6- 13 | 8 5/8 | - 1/8 | -1.4 |

| | | | | |
|------------------------|---------|---------|--------|------|
| A ELECTRONIC ENGINEER. | 6- 14 | 8 3/4 | + 3/8 | +4.4 |
| N FOXBORO | 23- 41 | 27 | -2 1/4 | -7.6 |
| O GENERAL AUTOMATION | 13- 39 | 36 1/2 | + 1/4 | +0.6 |
| O GRI COMPUTER CORP | 2- 5 | 2 1/2 | - 1/8 | -4.7 |
| N HEWLETT-PACKARD CO | 46- 77 | 73 3/4 | +4 | +5.7 |
| N HONEYWELL INC | 118-170 | 122 1/2 | +1 7/8 | +1.5 |
| N IBM | 333-426 | 394 | +9 | +2.3 |

| | | | | |
|---------------------|--------|--------|--------|-------|
| O INTERDATA INC | 8- 16 | 10 1/4 | - 1/2 | -4.6 |
| N MEMOREX | 15- 38 | 16 1/2 | -1 1/4 | -7.0 |
| O MICRODATA CORP | 5- 10 | 7 1/2 | - 1/8 | -1.6 |
| N NCR | 29- 38 | 32 | 0 | 0.0 |
| N RAYTHEON CO | 27- 47 | 34 3/4 | - 1/4 | -0.7 |
| N SPERRY RAND | 30- 49 | 45 3/4 | + 1/8 | +0.2 |
| A SYSTEMS ENG. LABS | 7- 16 | 8 3/8 | + 7/8 | +11.6 |

| | | | | |
|-----------------------|---------|---------|--------|------|
| N VARIAN ASSOCIATES | 14- 22 | 17 1/8 | -1 1/8 | -6.1 |
| N VICTOR COMPUTOMETER | 15- 24 | 18 5/8 | + 5/8 | +3.4 |
| N WANG LABS. | 23- 61 | 26 5/8 | - 3/8 | -1.3 |
| N XEROX CORP | 121-172 | 148 1/4 | -1 1/4 | -0.8 |

LEASING COMPANIES

| | | | | |
|------------------------|-------|--------|-------|-------|
| A BOUTHE COMPUTER | 3- 18 | 3 3/8 | - 3/4 | -18.1 |
| O BRESNAHAN CORP. | 2- 3 | 1 5/8 | - 1/8 | -7.1 |
| O COMDISCO INC | 3- 18 | 14 1/2 | 0 | 0.0 |
| O COMMERCE GROUP CORP | 5- 11 | 5 3/4 | 0 | 0.0 |
| O COMPUTER EXCHANGE | 1- 3 | 5/8 | + 1/8 | +25.0 |
| A COMPUTER INVSTRS GRP | 7- 14 | 6 3/4 | - 3/8 | -5.2 |
| N DPF INC | 5- 13 | 6 | + 1/4 | +4.3 |

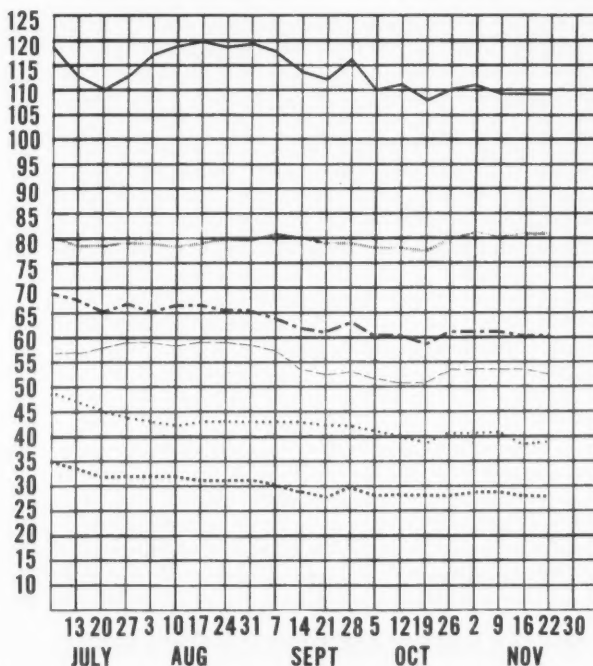
| | | | | |
|----------------------|--------|--------|-------|-------|
| M DATRONIC RENTAL | 2- 4 | 2 1/2 | 0 | 0.0 |
| A DCL INC | 2- 10 | 3 | + 1/2 | +20.0 |
| A DEARBORN-STORM | 16- 26 | 21 5/8 | + 1/8 | +0.5 |
| A DPA, INC. | 5- 8 | 8 1/4 | + 1/4 | +3.1 |
| A GRANITE MGT | 5- 11 | 5 7/8 | - 1/8 | -2.0 |
| A GREYHOUND COMPUTER | 6- 11 | 7 | 0 | 0.0 |
| A ITTEL | 7- 12 | 9 5/8 | + 3/8 | +4.0 |

| | | | | |
|---------------------|--------|--------|-------|------|
| N LEASCO CORP | 17- 24 | 19 1/4 | - 3/8 | -1.9 |
| O LEASPAC CORP | 6- 15 | 7 1/8 | 0 | 0.0 |
| O LECTRO MGT INC | 1- 4 | 2 1/8 | - 1/8 | -5.5 |
| A ROCKWOOD COMPUTER | 2- 7 | 2 1/4 | + 1/8 | +5.8 |
| O SYSTEMS CAPITAL | 3- 20 | 11 3/4 | +1 | +9.3 |
| N U.S. LEASING | 19- 33 | 30 | + 1/2 | +1.6 |

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
P=PHIL-BALT-WASH
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Computer Stocks Trading Index

Computer Systems Software & EDP Services
Peripherals & Subsystems Leasing Companies
Supplies & Accessories CW Composite Index



Earnings Reports

INTEL
Nine Months Ended Sept. 30
a1972 1971
Shr Ernd \$.88 \$.53
Revenue 14,924,091 6,531,567
bSpec Cred 1,157,659 1,403,760
Earnings 2,358,278 1,222,587

a-Includes operations of Microma, a watch manufacturer, acquired in June 1972. b-In 1972 from tax loss carryforward; in 1971 from sale of knowhow.

TEC
Three Months Ended Sept. 30
1972 1971
Shr Ernd \$.12 \$.05
Revenue 1,307,895 1,072,726
Earnings 83,493 32,493

Company has changed to a fiscal year ending June 30 from a fiscal year ending April 30.

GENERAL AUTOMATION
Year Ended July 31
1972 1971
Shr Ernd \$.81 \$.81
Revenue 16,028,994 \$10,627,868
Tax Cred 649,270
Earnings 1,567,534 3,100

CONTROL DATA
Three Months Ended Sept. 30
1972 1971
Shr Ernd \$1.09 \$1.09
Revenue 168,403,000 \$123,064,000
Spec Chg 16,000 124,000
Earnings 16,655,000 337,000
9 Mo Shr 3.03 1.74
Revenue 460,930,000 405,172,000
Spec Cred 802,000 322,000
Earnings 45,711,000 26,348,000

a-Preferred dividend requirements exceeded net income.

FAIRCHILD INDUSTRIES
Three Months Ended Sept. 30
1972 1971
Shr Ernd \$.34 \$.37
Revenue 49,370,000 63,522,000
Earnings 1,570,000 1,708,000
9 Mo Shr 1.07 1.09
Revenue 177,993,000 189,963,000
Earnings 4,877,000 4,976,000

HAZELTINE
Three Months Ended Sept. 30
a1972 1971
Shr Ernd \$1.74 \$1.74
Revenue 14,048,000 \$7,785,000
Spec Cred b3,311,000
Earnings 3,399,000 (163,000)
9 Mo Shr 1.98
Revenue 41,190,000 24,096,000
Spec Cred b3,664,000
Earnings 3,874,000 (743,000)

a-Includes Hazeltine Research Corp. b-In the quarter consists of \$1.2 million tax loss carryforward and a \$2.1 million gain from sale of properties. In the nine months consists of \$1.4 million tax credit and \$2.2 million gain from sale of properties.

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Chicago Milwaukee Indianapolis
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So you can shuffle assignments before there's a production bottleneck.

Research Corporation
Sierra
Data Systems Division
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Burlington, Massachusetts 01803
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Mark III is not just another time-sharing system, but a new approach to information processing. It's a single, unified service that combines the response of interactive time-sharing, the economy of remote batch processing, and the reach of a worldwide communications network.

Mark III has a comprehensive budget control system that lets you allocate computing dollars—by project, department, individual—tailored to your needs. It will automatically administer the allocations. And even give you daily reports at your own terminal.

Mark III not only helps you control costs, but actually reduce them. You can save one-half or more of your processing costs just by moving your time-sharing programs into remote batch operation.

Mark III is an integrated network of

nearly 100 interconnected computers. With a network this size, each computer performs that task for which it's best suited—communications, interactive time-sharing, or batch processing. The result is a service that can tackle all your computing easily, reliably, and economically.

General Electric was first to introduce time-sharing service in 1965. First to establish an international information processing network linking over 250 locations in North America and Europe. And now, with Mark III, first to put you in real control of your computing dollars.

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